Original Article

Evaluation of Fingertip Blood Glucose Level after Handling Sweet Items and Various Methods of Hand Cleaning at a Tertiary Care Hospital in Southern Sindh

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ABSTRACT

Objective: To evaluate the effect on fingertip blood glucose level after handling sweet items and after various methods of hand cleaning.

Study Design: Observational / cross-sectional study.

Place and Duration of Study: This study was conducted at the Isra University Hospital Hyderabad. from July 2017 to December 2017.

Materials and Methods: Sample size was 154 cases. Informed consent was obtained from all enrolled subjects. Proforma was designed and filled for each subject. Data was analyzed on SPSS version 22. T test was applied for statistical significance.

Results: Gender distribution of patients in the study population male were 106 (68.8%), female 48 (31.2%). Most common age group was 18 – 30 year (41.6%), rural 72 (46.8%), urban 82 (53.2%). In the enrolled cases non - diabetics 118 (76.6%), diabetics 36 (23.4%). Mean of blood glucose level of the test fingertips - right hand middle finger (RHMF) and right hand ring finger (RHRF) in non – diabetics after washing with water was 97.76±17.86 mg/dl, 96.50±18.12 mg/dl respectively. Which was compatible to control fingertip – left hand middle finger (LHMF). Mean of blood glucose level of the test fingertips - RHMF and RHRF in diabetics after washing with water was 195.33±69.12 mg/dl, 194.72±69.56 mg/dl respectively which was comparable to control fingertip – left hand middle finger (LHMF).There is no significant difference between the mean of blood glucose of the test fingertips -, RHMF and RHRF after washing with water as compared to the control fingertip - LHMF. Our study shows that water is superior to alcohol swab in cleaning hands after handling sweet items before checking fingertip blood glucose levels.

Conclusion: There is a significant elevation in fingertip blood glucose level after application of sweet itemsand even after cleaning with alcohol swab. Water is superior to alcohol swab in cleaning hands after handling sweet items before taking fingertip blood glucose levels. Health care providers, pharmacists and other professionals should play their role to educate the people to create awareness.

Key Words: fingertip blood glucose, sweet items handling, methods of cleansing

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INTRODUCTION

It is common practice to prick fingertip for blood glucose sample in diabetics and non-diabetics subjects without washing hands. One study showed that only 50% of patients wash their hands before checking[1].

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Even though the value of self – monitoring of blood glucose (SMBG) levels in diabetes is controversial, there is no doubt that SMBG provides a strong facility for improved self – care[2,3,4] The SMBG through capillary blood glucose level commonly known "fingertip – stick glucose" is an important part of management of diabetic patients[5] SMBG is currently recommended for patients type 1 and type 2 diabetes mellitus, insulin treated or not treated[5,6,7]

Higher fingertip blood glucose level was reported from the subjects who had peeled fruit or handled sweet food items before checking SMBG and not washed their hands with water [8,9]

Hand washing is important to remove substances from the skin that could falsely elevate glucose readings[8]

Rationale of Study: No national data is available on such study, whereas as few studies are available at

international level. Therefore, this study was conducted to determine the effect on fingertip blood glucose level after handling sweet items and after various methods of hand cleansing especially washing hands with water before checking fingertip blood glucose level.

MATERIALS AND METHODS

Total 154 subjects were enrolled from outpatient clinics of medicine department of Isra University Hospital Hyderabad after informed consent was obtained. Study design was cross-sectional observational. Study period was from July 2017 to December 2017. Each subject's LHMF was taken as control, RHMF and RHRF were used as test. EasyMax –Glucometer and pricker were used to check fingertip blood glucose levels. The RHMF and RHRF tips were coated with moist dates and honey respectively. One hour after application of dates and honey the fingertip blood glucose level was checked from the respective fingertips of right hand. Then the fingertips were cleaned with alcohol swab (70% isopropyl alcohol) and rechecked the fingertip blood glucose level. After washing the right hand with water and dried another blood glucose level was checked from the fingertips. At the same time left hand middle fingertip was cleaned with alcohol swab and dried, then fingertip blood glucose level was checked.

Inclusion Criteria:

1. Age 18 years and above
2. Willing for participation

Exclusion Criteria:

1. Age below 18 years
2. Not willing for participation

RESULTS

Table 1. shows distribution of patients in the study population, males were 106 (68.8%), females 48 (31.2%). Most common age group was 18 – 30 year (41.6%), rural 72 (46.8%), urban 82 (53.2%). In the enrolled cases non - diabetic 118 (76.6%), diabetic 36 (23.4%).

Table 2. shows mean of blood glucose from control fingertip - LHMF in non – diabetic cases were 106.24±17.52 mg/dl and in diabetic 224.55±73.61 mg/dl. After one - hour application of dates and honey in the test fingertips - RHMF and RHRF, the mean of blood glucose from the test fingertips in non – diabetic cases were 383.39±152.35 mg/dl, 388.42±17.34 mg/dl respectively. The mean of blood glucose from test fingertips -RHMF and RHRF in diabetic cases were 448.56±152.02 mg/dl, 385.22±164.42 mg/dl respectively which was elevated significantly as compared to control fingertip - LHMF p-value < 0.05

Table 3. shows mean of blood glucose level in the test fingertips - RHMF and RHRF in non – diabetics after alcohol swab cleaning was 181.58±75.83 mg/dl, 159.12±49.69 mg/dl respectively.

Table No. 1: Patient distribution according to Demographic characteristics (n=154)

Variables	Frequency	Percent
Age groups		
18-30 years	64	41.6%
31-40 years	28	18.2%
41-50 years	24	15.6%
51-60 years	26	16.9%
61-70 years	12	07.8%
Total	154	100.0%
Gender		
Male	106	68.8%
Female	48	31.2%
Total	154	100.0%
Diabetes status		
Diabetic	36	23.4%
Non-diabetic	118	76.6%
Total	154	100.0%
Residence		
Rural	72	46.8%
Urban	82	53.2%
Total	154	100.0%

Mean age (Mean ± SD=38.50±1.51 years)

Table No. 2: Comparison of mean of blood glucose in control - LHMF with test – RHMF and RHRF among diabetic and non-diabetic cases (n=154)

Variables	Control - LHMF	Test - Dates RHMF	P-value
LHMF versus RHMF Diabetes n=36	224.55±73.61mg/dL	448.56±152.02 mg/dL	0.0001
Non-diabetes n=118	106.24±17.52 mg/dL	383.39±152.35 mg/dL	0.0001
LHMF versus RHRF	Control - LHMF	Test - Honey RHRF	
Diabetes n=36	224.55±73.61 mg/dL	385.22±164.42 mg/dL	0.0001
Non-diabetes n=118	106.24±17.52 mg/dL	388.42±171.34 mg/dL	0.0001

Table No.3: Comparison of mean of blood glucose in control - LHMF with test – RHMF and RHRFafter cleaning with alcohol swab among diabetic and non-diabetic cases (n=154)

Variables	Control - LHMF	Test - RHMFafter cleaning with alcohol swab	P-value
LHMF versus RHMF Diabetes n=36	224.55±73.61 mg/dL	270.56±109.69 mg/dL	0.001
Non-diabetes n=118	106.24±17.52 mg/dL	181.58±75.83 mg/dL	0.001
LHMF versus RHRF	**Control - LHMF**	**Test - RHRFafter cleaning with alcohol swab**	
Diabetes n=36	224.55±73.61 mg/dL	241.67±109.69	0.001
Non-diabetes n=118	106.24±17.52 mg/dL	159.12±49.69 mg/dL	0.001

Table No. 4: Comparison of mean of blood glucose in control - LHMF with test - RHMF and RHRF after washing with water among diabetic and non-diabetic cases (n=154)

Variables	Control - LHMF	Test - RHMFafter washingwith water	P-value
LHMF versus RHMF Diabetic n=36	224.55±73.61 mg/dL	195.33±69.12 mg/dL	0.052
Non-diabetic n=118	106.24±17.52 mg/dL	97.76±17.86 mg/dL	0.051
LHMF versus RHRF	**Control - LHMF**	**Test - RHRF after washingwith water**	
Diabetic n=36	224.55±73.61 mg/dL	194.72±69.56 mg/dL	0.052
Non-diabetic n=118	106.24±17.52 mg/dL	96.50±18.12 mg/dL	0.060

Mean of blood glucose level in the test fingertips - RHMF and RHRF in diabetics after alcohol swab cleaning was 270.56±109.69 mg/dl, 241.67±109.69 mg/dl respectively which was elevated significantly as compared to control fingertip - LHMF p-value < 0.05

Table 4. shows mean of blood glucose level in the test fingertips - RHMF and RHRF) in non – diabetic after washing with water was 97.76±17.86 mg/dl, 96.50±18.12 mg/dl respectively. Which was compatible to control fingertip - LHMF. Mean of blood glucose level in the test fingertips - RHMF and RHRF in diabetic after washing with water was 195.33±69.12 mg/dl, 194.72±69.56 mg/dl respectively. There is no significant difference between the meanof blood glucose of the test fingertips - RHMF and RHRF after washing with water as compared to the control fingertips - LHMF p-value > 0.05

DISCUSSION

In our study population there is a significant elevation in fingertips blood glucose level after application of sweet items and even after cleaning with alcohol swab. There is no significant difference between the mean of blood glucose in the test fingertips - RHMF and RHRF after washing with water as compared to the control fingertips- LHMF. Washing hands with water is superior to cleaning with alcohol swab before taking fingertip blood glucose. This study is compatiblewith other studiesconducted by Hirose T et all (Tokyo, Japan 2011)[8], Josivan Lima et al (Rio Grande do Norte, Brazil 2016)[9], MA Olamovegunet et al (Ogbomoso, Nigeria 2016)[10]

Our study is inconsistent with study done by Mahoney JJ et all (California, USA 2011).[11] In this Mahoney JJ et al elaborates that hand sanitizers are recognized as effective tools for reducing infection rates and are recommended for hand hygiene in clinical settings[12]. Frequent use of alcohol – based hand sanitizers containing emollients may be better tolerated than washing hands with soap or detergents[13], perhaps due to alcohol removes fewer skin surface lipids and is less drying[14]. However, the frequency of use of hand sanitizer for skin cleaning prior to glucose testing is unknown. Hydroquinone-containing body lotions induce falsely elevated capillary glucose measurements that persisted up to 60 minutes after usage[15]

CONCLUSION

There is a significant elevation in fingertip blood glucose level after application of sweet itemsand even after cleaning with alcohol swab.There is no significant difference between the mean of blood glucose of the test fingertips - RHMF and RHRF after washing with water as compared to the control fingertips - LHMF. Water is superior to alcohol swab in cleaning the hands after handling sweet items before taking fingertip blood glucose levels. Health care providers, pharmacists and other professionals should play their role to educate the people to create awareness.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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