Commuter poisoning

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Poison

ANY SUBSTANCE WHICH WHEN ADMINISTERED BY ANY ROUTE, IS CAPABLE OF PRODUCING DESEASES, DEATH OR IMPAIR NORMAL PSYCHOLOGICAL FUNCTION IN HUMAN BEING.

(BASIC SCIENCE OF POISONS -5TH EDITION,MC GRAW HILL)

Traditionally it may be accidental, suicidal, homicidal.

History

4500 BC to present day

Ancient times, used for hunting or to quicken death of prey or enemies.

As early 331 BC: Roman era ; at dinner table.

In medieval Europe, poison became form of killing.

“Apothecaries” shops selling various medicinal wares, well open to public, traditionally used for curative purpose well employed to more sinister ends.

In middle east and Arab, developed Aresenic; odorless and colorless.

History contd……..
India

“Sushruta”- defined slow poisoning and it’s remedies.

“Chanakya” – (350-283 BC) ; prime minister of Chandragupta suggested employing means such as seduction, secret use of weapons, poison for political gains.

History contd…..
Rome

Emperor Nero used cyanide.

Greek

Socrates 399 bc by hemlock.

Present day

Poisoning is fourth most common cause of death in young. Commonly by –

* paracetamol
* warfarin
* opioids
* benzodiazepens
* methanol
* ethelyn glycol
* cyanide
* Datura

Bangladesh and Asian Perspective

Commuter

A person who travels regularly, by automobiles, bus,train etc, between a residence and place of employment.

Commuter poisoning

Transport related ,street…. Poisoning.

Contd…

Travel related poisoning increased from 6.1% to 9.5%.

Representing 46.6% to 55.7% of all admitted poisoning cases.

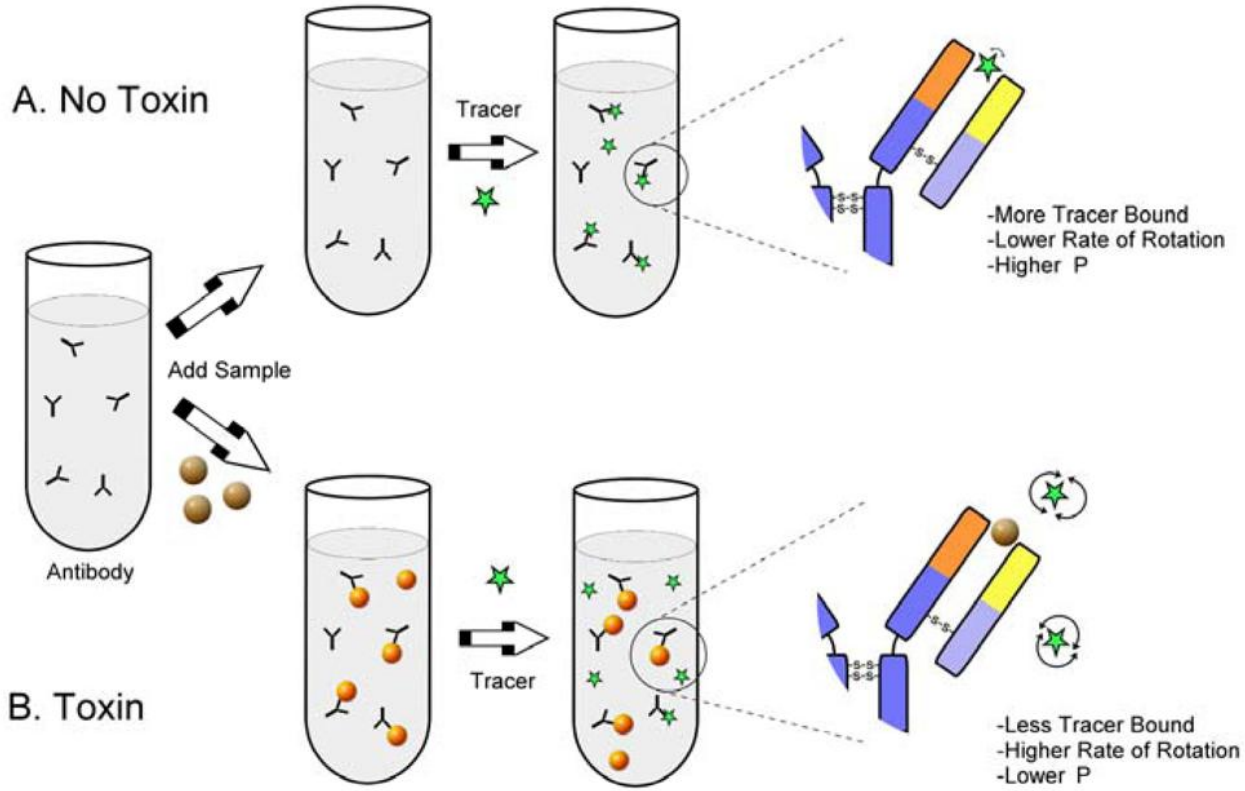
98% of them remembered buying and accepting food/ drinks before losing consciousness.

Toxicological analysis done by

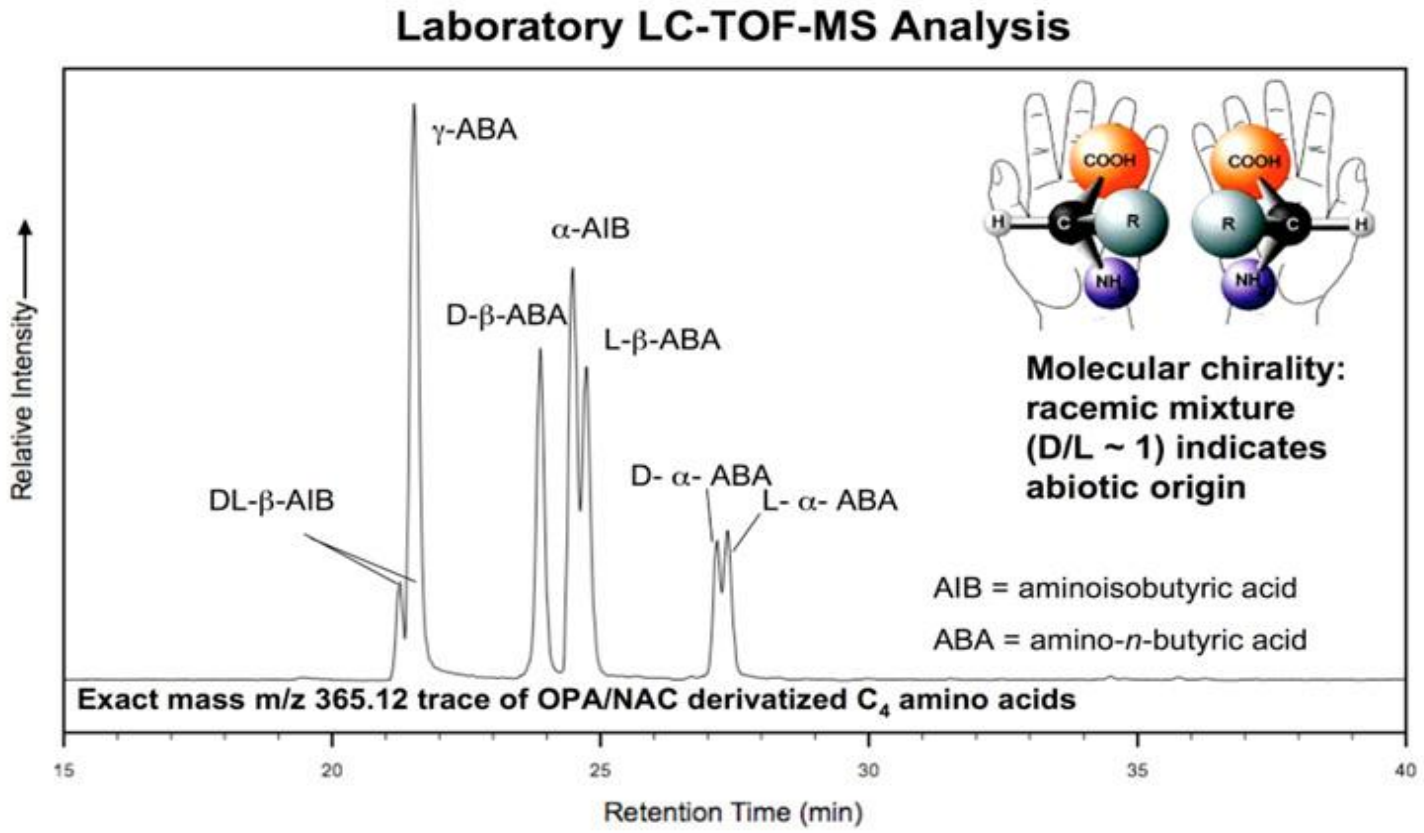
* **FPIA (** fluroscence polarization immunoassay)

***LC-TOF-MS (**liquid chromatography coupled to time of flight mass spectometry)

FPIA


A. No Toxin
Tracer
-More Tracer Bound
-Lower Rate of Rotation
-Higher P
Add Sample
Antibody
B. Toxin
Tracer
-Less Tracer Bound
-Higher Rate of Rotation
-Lower P

LC – TOF - MS


Laboratory LC-TOF-MS Analysis
γ-ABA
α-AIB
D-β-ABA
L-β-ABA
D- α- ABA
L- α- ABA
DL-β-AIB
Relative Intensity
COOH
H
C
R
NH
Molecular chirality:
racemic mixture
(D/L ~ 1) indicates
abiotic origin
AIB = aminoisobutyric acid
ABA = amino-n-butyric acid
Exact mass m/z 365.12 trace of OPA/NAC derivatized C4 amino acids
15
20
25
30
35
40
Retention Time (min)

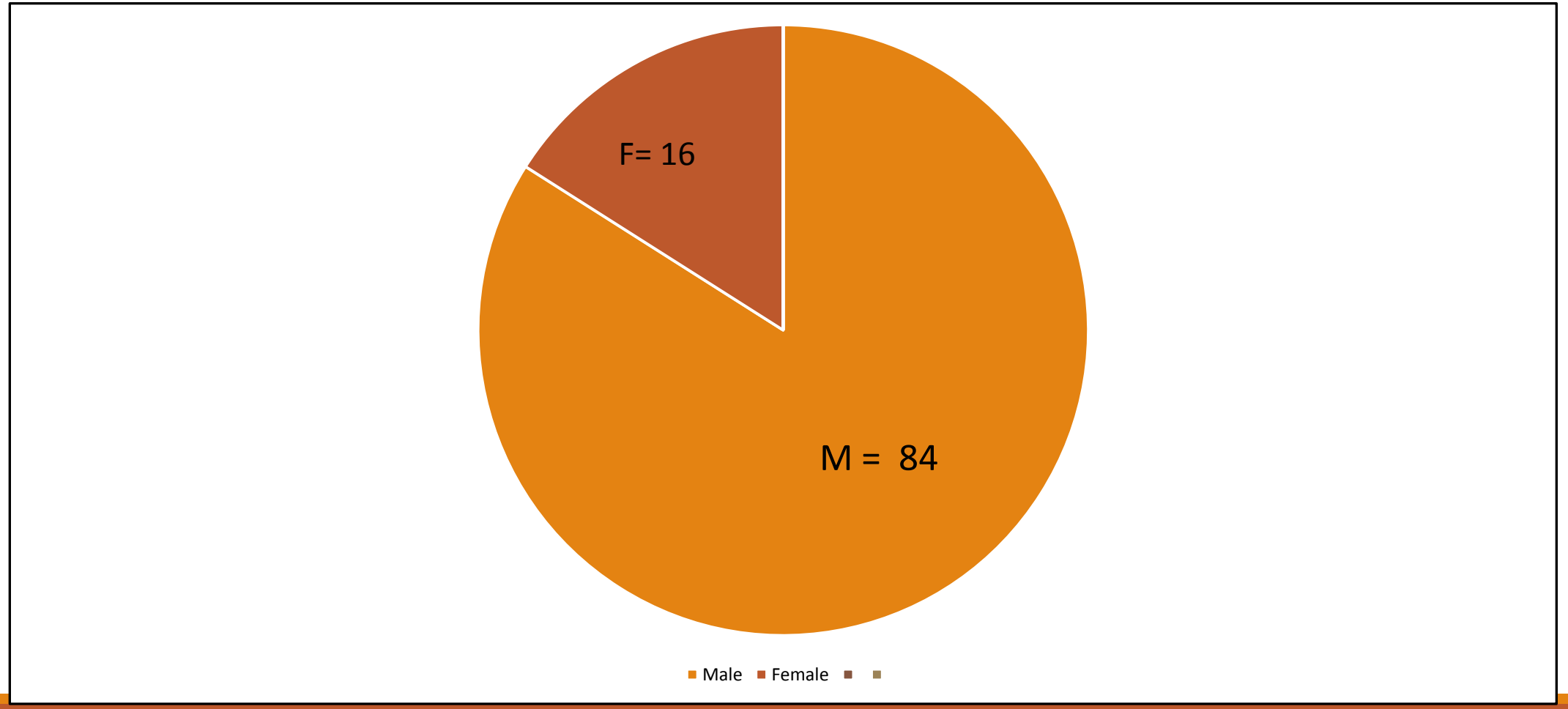
Contd…

Descriptive cross sectional study at **Khyber teaching hospital,Peshwar,Pakistan** from july 2010 to july 2011.

100 cases were enrolled.

Age range in years	**Number of patients**	**Percentage**
15-25	10	10
26-35	**26**	**26**
36-45	24	24
46-55	22	22
56-65	18	18

Gender distribution of victims for street and travel poisoning (n=100)



Pattern of poisoning in male victims(n=84)

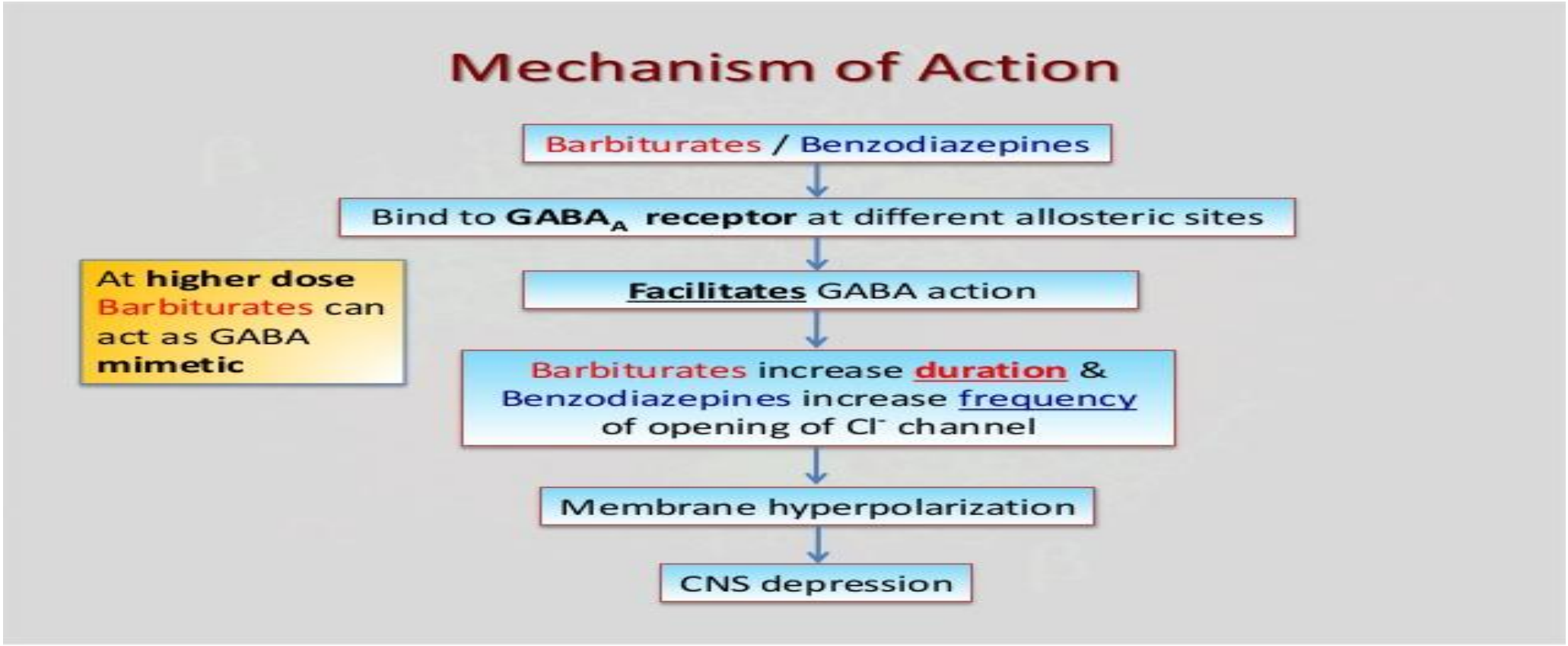
Type of drugs /poisons	Number of Patients	Percenatage
Benzodiazepines	**50**	**59.52**
Opioid derivatives	32	38
Mixed Benzodiazepines & Opioid derivatives	2	2.38

Pattern of poisoning in female victims for street and travel poisoning (n=16)

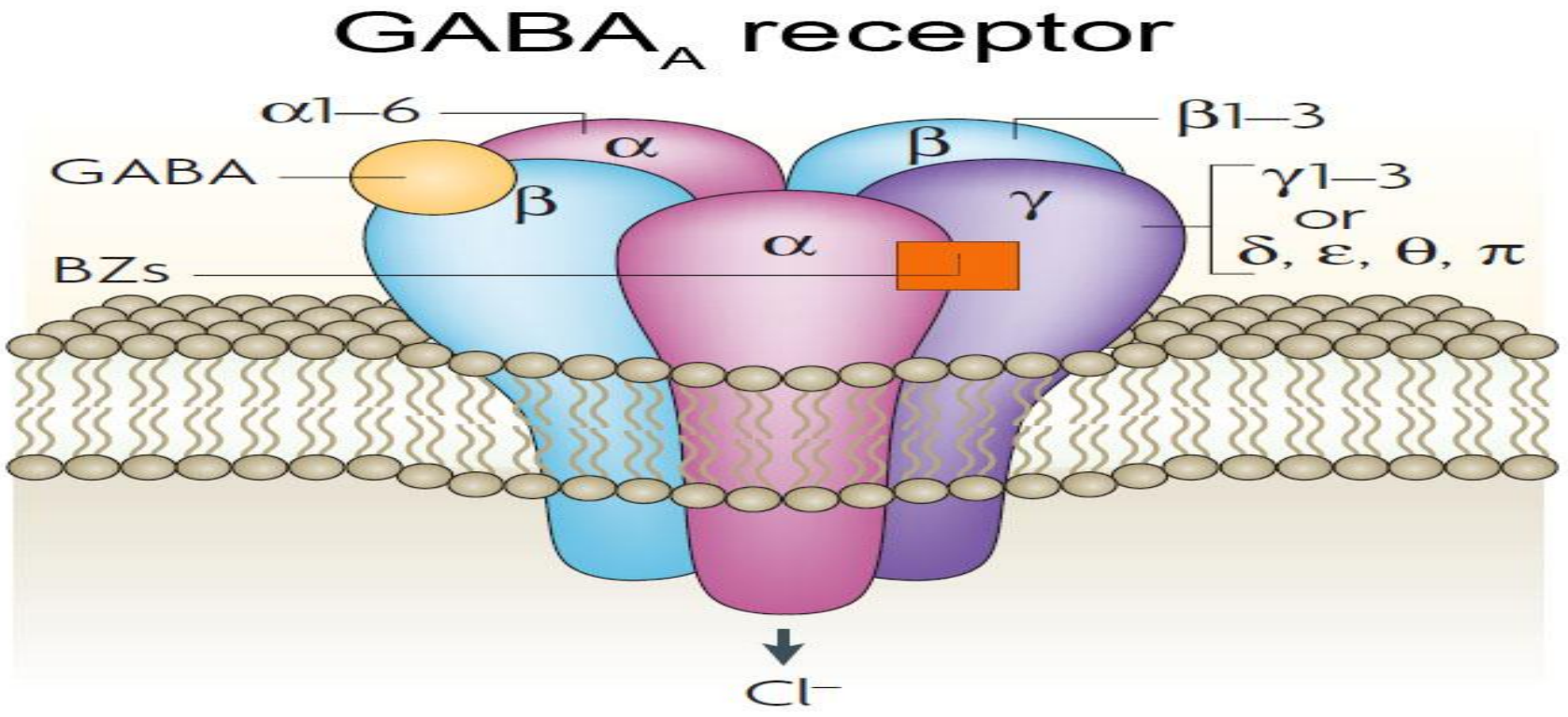
Type of drugs /poisons	Number of Patients	Pecentage
Benzodiazepines	**10**	**62.5**
Phenobarbitone	4	25.0
Rat killer	2	12.5

Datura poisoning…

Mechanism of action of benzodiazepens

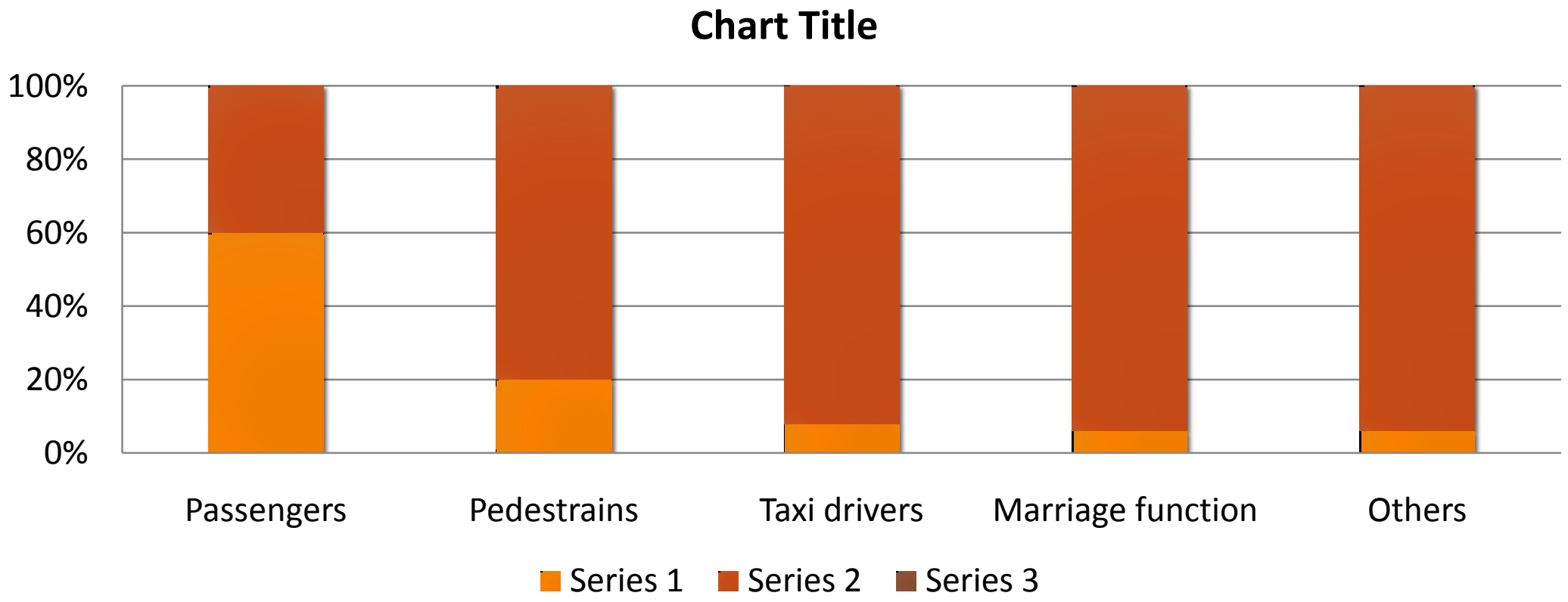


GABA receptor

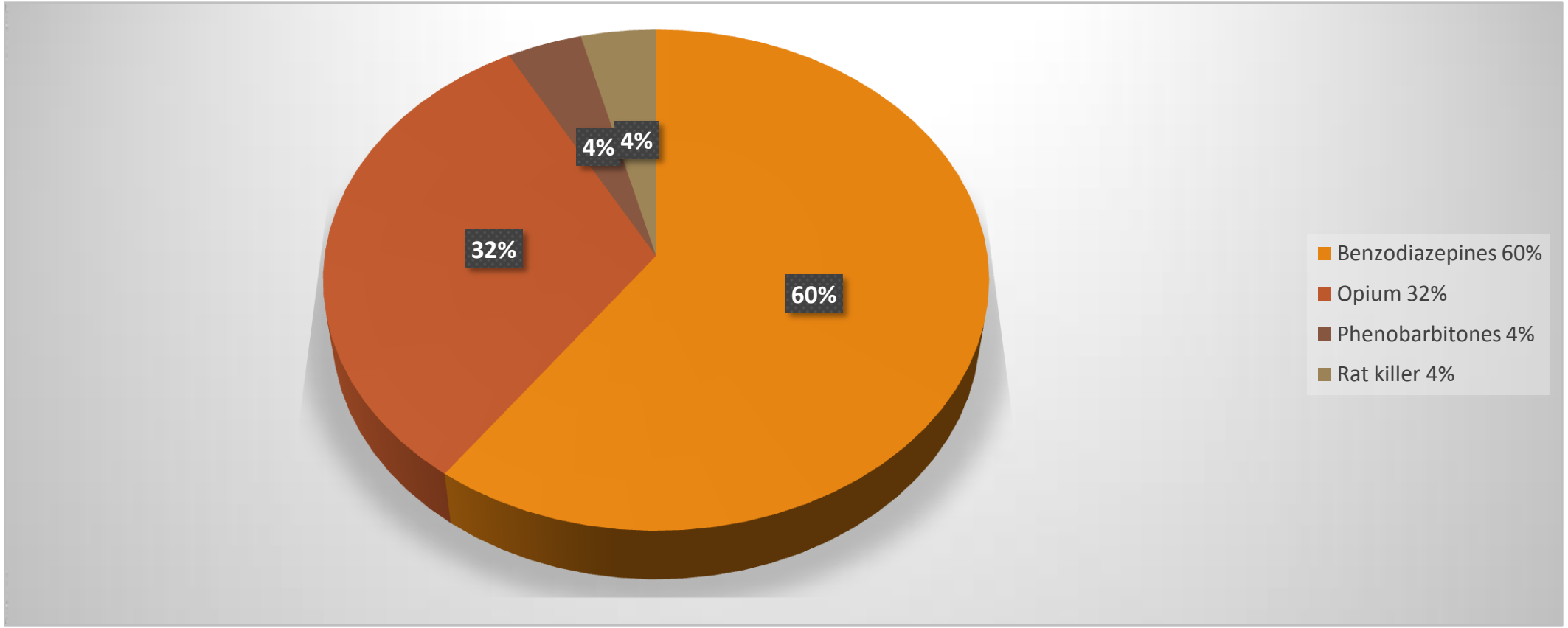


Jacob et al., Nature Reviews Neuroscience, 2008

The pattern of types of the victims for street and travel poisoning.



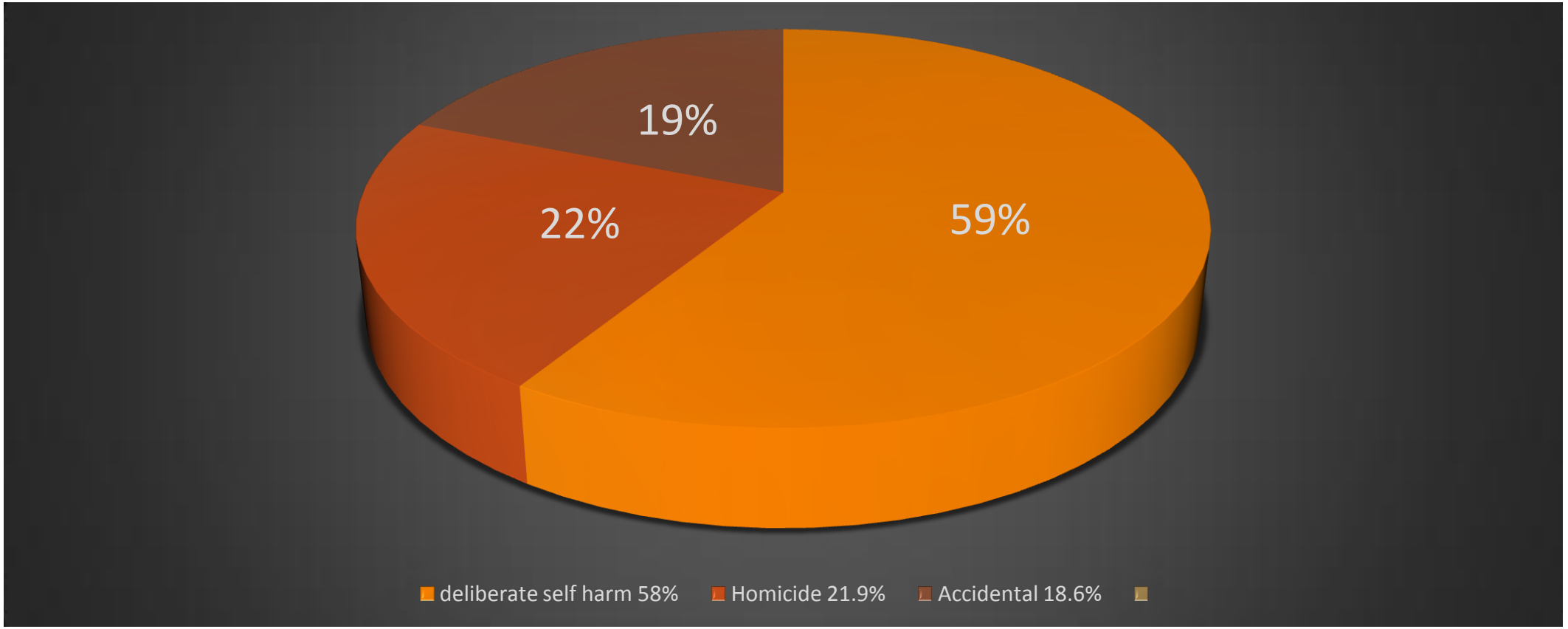
Percentage of drugs used for street and travel poisoning.



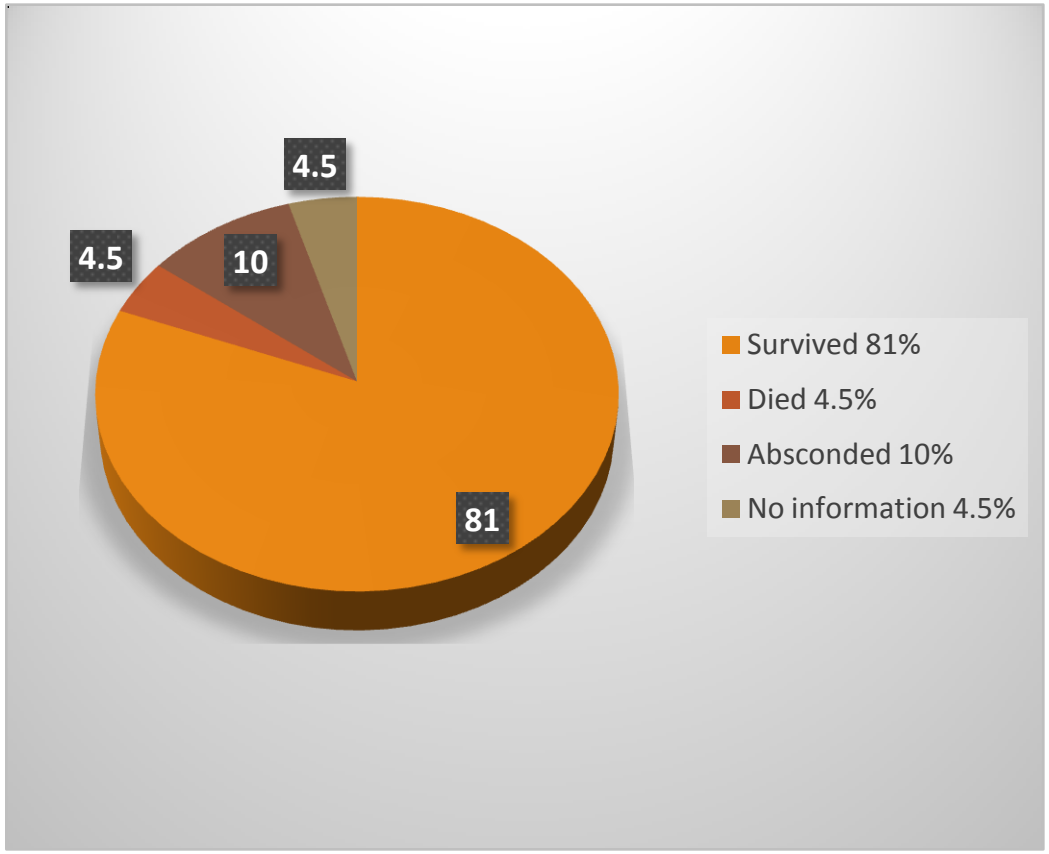
Study in Bangladesh [n = 392]

(May to july 2005;at 2 UMC,1 dist. Hosp,1 medicine unit at DMCH)

journal of medicine 2009; 10 [supp 1]



Outcome of Poisoning (n=397)



Simple individual awareness of safe travel, refraining from eating on travel could prevent homicidal poisoning.

46 pt. left hospital without informing health professionals.

Another Study at DMCH; 5 medicine units (Jan-June) 2004 [130 patients] and a convenience sample of another 15 pt. in 3 days in may 2006.

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journal homepage: www.elsevier.com/locate/forsciint

Criminal poisoning of commuters in Bangladesh: Prospective and retrospective study

M. Mahbub Alam Majumder [a], Ariful Basher [a], M. Abul Faiz [a,b], Ulrich Kuch [c], Werner Pogoda [c], Gerold F. Kauert [c], Stefan W. Toennes [c,*]

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Contd…

130 patients aged 16 – 80 years who were admitted with CNS depression (**GCS 3-14)**

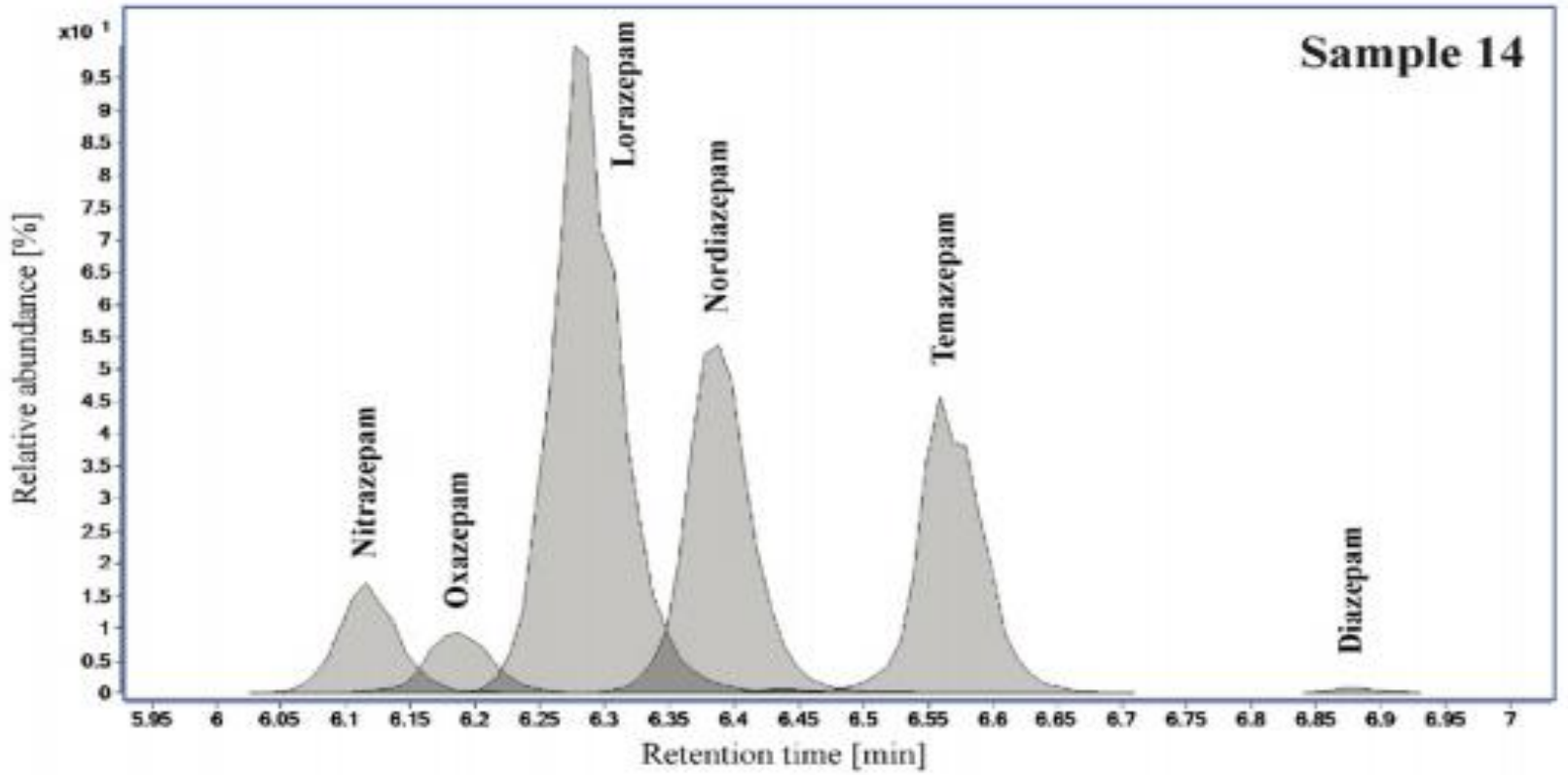
94 urine samples analyzed by **FPIA; (***74% positive for benzodiazepens.)*

15 urine samples analyzed by **LC-TOF-MS**

- **Lorazepam** in **all** samples.
- **Diazepum** in **5.**
- **Nitrazepum** in **3.**

Compound chromatograms of internal standards added to the samples prior to work-up (example from sample 14, cf. Fig. 3). The amounts added were equivalent to 50 mg/l of urine except for buprenorphine-d4, which was 5 mg/l.

M.M.A. Majumder et al. / Forensic Science International 180 (2008) 10–16



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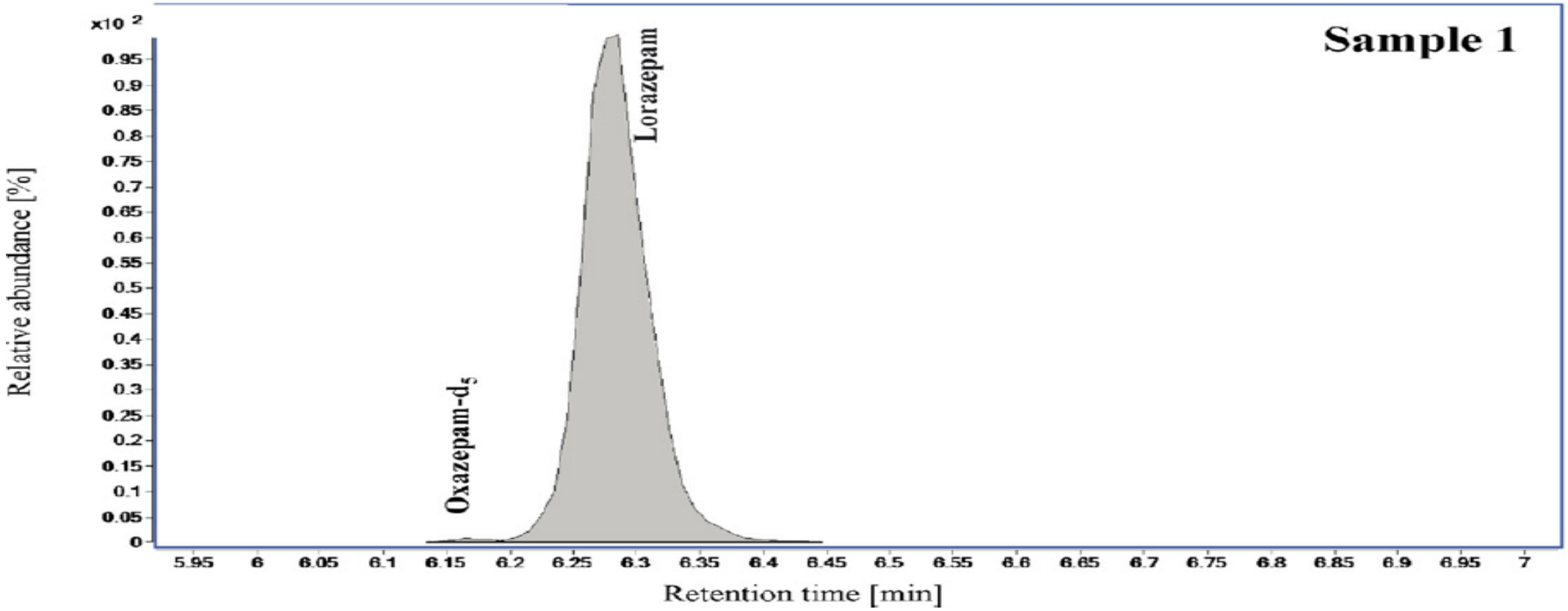
Sample 1
x10 2
Relative abundance [%]
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Lorazepam
Oxazepam-d5
5.95
6
6.05
6.1
6.15
6.2
6.25
6.3
6.35
6.4
6.45
6.5
6.55
6.6
6.65
6.7
6.75
6.8
6.85
6.9
6.95
7
Retention time [min]

Contd…

-Mean age of victim 28.8 year ± 2.5SD in 2004 study and 37 year ± 10SD in 2006 study

-Males were 98% (n=145)

-**Most incidents occurred in bus(76%)**

-98% remembered buying or accepting food/drink before losing consciousness.

-Drinks were majority

Types of food	Percentage
Green coconut	**24**
Cold drinks	21
Tea	21
Other fruit juices	4
Herbal medicine	10
Biscuits,Cigarettes,Betel nuts	6

On neurological assessment

74% - GCS - 11-14

15% - GCS – 4-10

11% - GCS - 3

Contd…

Year	Total Admitted Patients	Number of Poison	Travel related poison
2004	3440	210(6.1%)	**46.6%**
2005	3843	291(7.5%)	**47.6%**
2006	3266	309(9.5%)	**55.7%**

Situation of Travel related poisoning in Bangladesh

Since 2008 to 2011, a total of 4435 cases of acute poisoning were admitted in the Medicine ward of Sylhet M. A. G. Osmani Medical College Hospital

Of them commuter poisoning (1919; 43.27%) was the most commonly occurring type ($p<0.05$) both in male and female & this trend remained same in almost all study years .

(***Asia pacific J of med toxicology 2014- 3-152-6***)

Contd…

Situation of induced poisoning in Bangladesh

Study year	Type of poisoning											Total
	OPC	Commuter (unknown agents) poisoning	Sedative	Harpic	Rat-killer	Corrosive	Alcohol	Kerosene	Paracetamol	Snake bite	Others	
2008	260	438	122	86	35	31	9	6	6	4	25	1022
2009	223	487	113	95	33	25	12	4	9	5	35	1041
2010	336	451	130	65	45	40	12	7	5	15	50	1156
2011	321	543	117	67	60	32	11	6	9	6	44	1216
Total	1140	1919	482	313	173	128	44	23	29	30	154	4435
Percentage	25.7	43.27	10.87	7.06	3.9	2.89	0.99	0.52	0.65	0.68	3.47	

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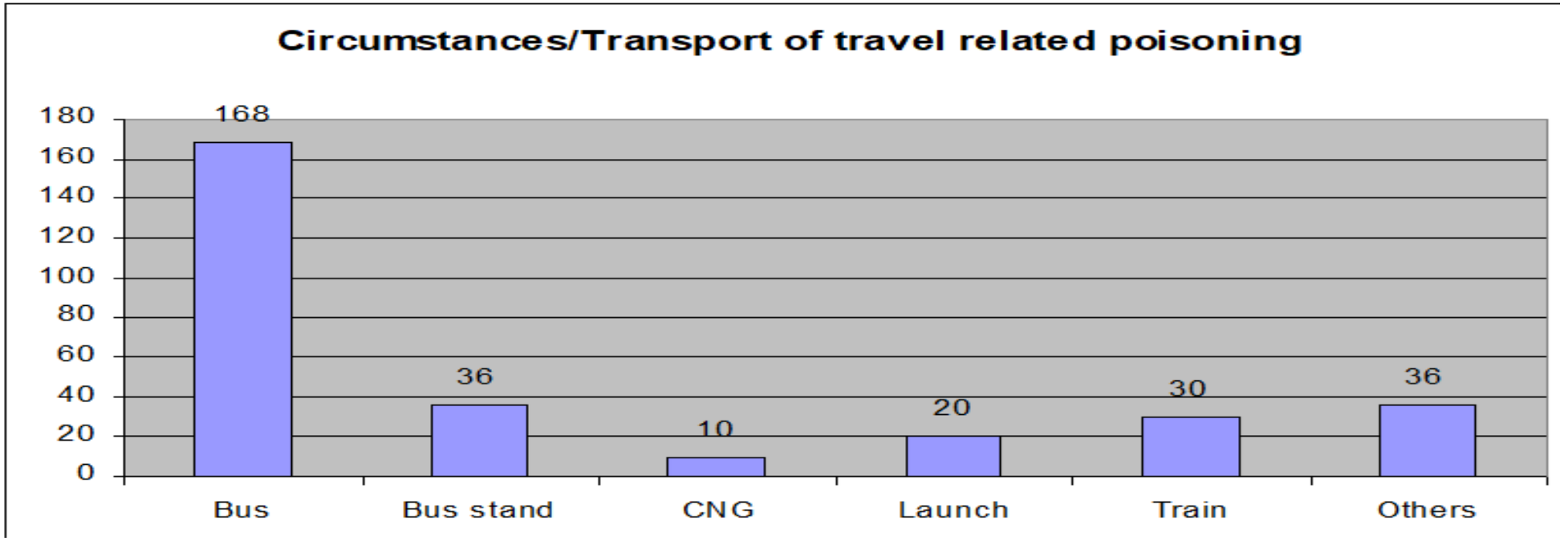
Mode and pattern of travel related poisoning



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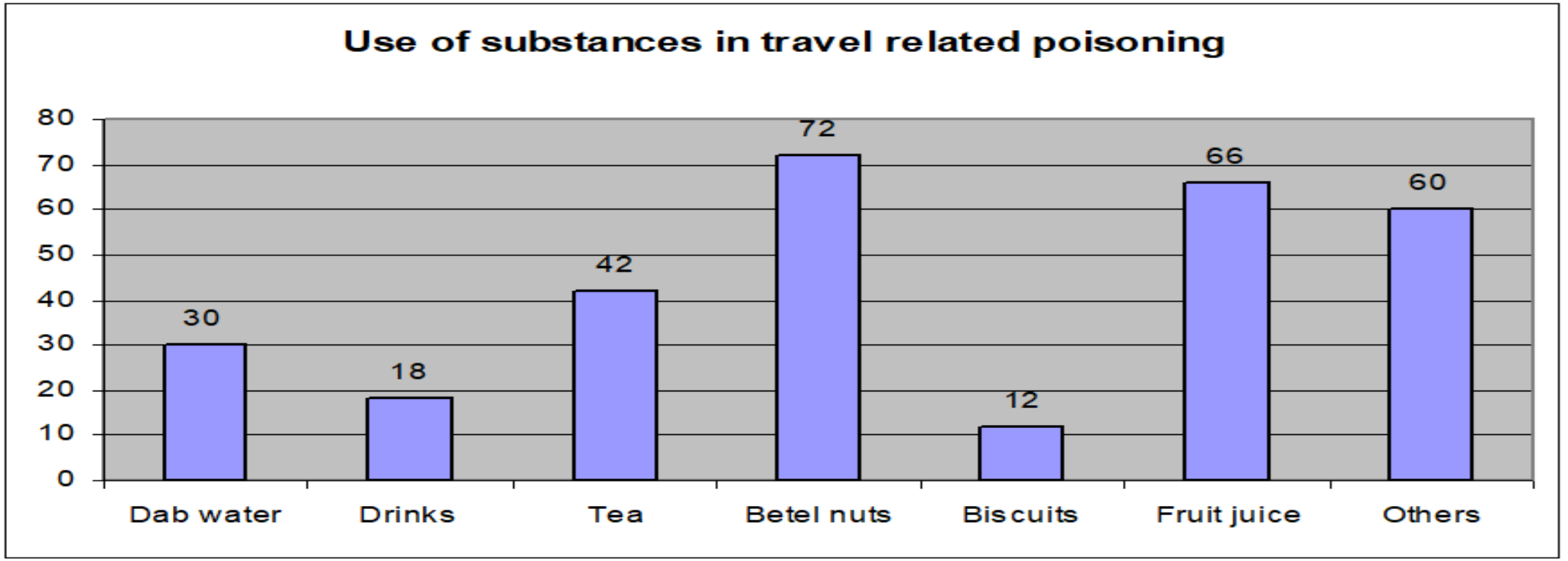
Mode and pattern of travel related poisoning



Mode and pattern of travel related poisoning

Majority (70%) of people were made stuporus with dab water, soft drinks and tea, betel leaf with nut

Smaller percentage of victims is offered cream biscuits, fruit, fruit juice

These agents are chosen as they are popular fast food, cheaper to buy and easily available and widely accepted.

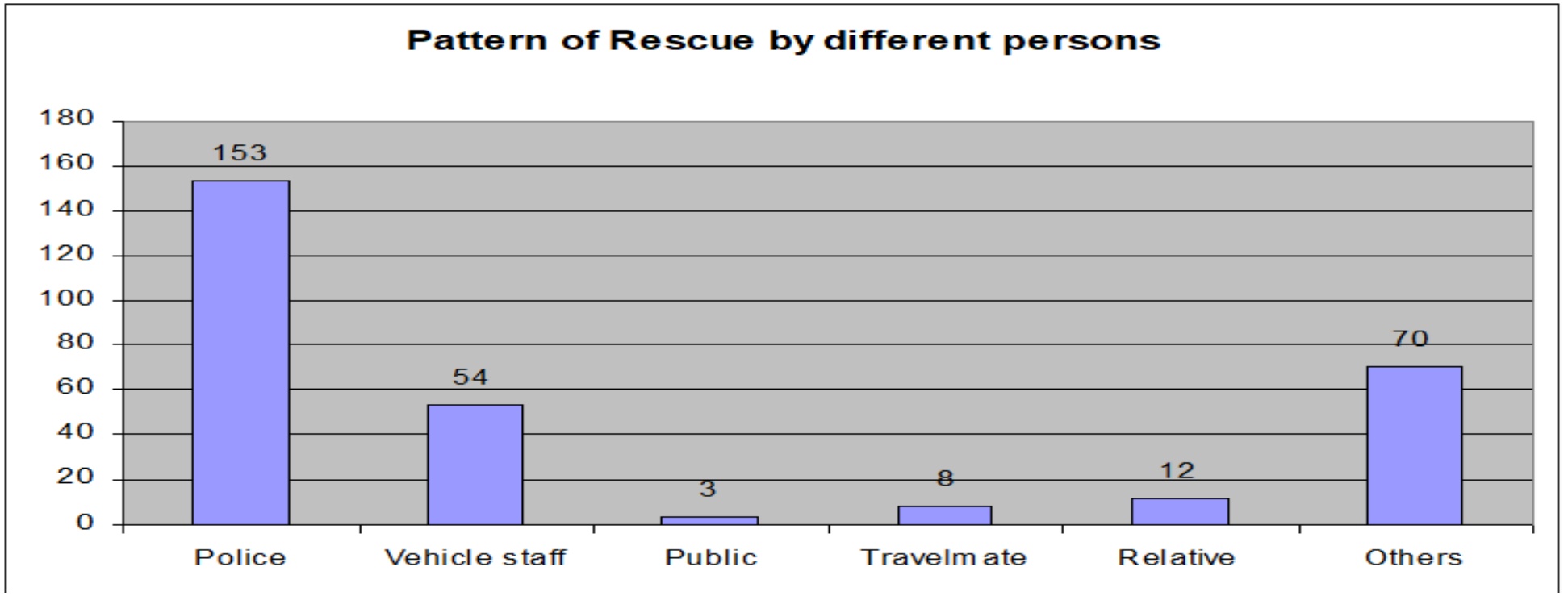
Mode and pattern of travel related poisoning

Majority of victim travels through bus. More incidence of induced poisoning occurred when they are returning home from office

Usually these patients are found unconscious on buses or other places of the public transport system, and are brought to hospital by police

Contd…

Mode and pattern of travel related poisoning



Mode and pattern of travel related poisoning

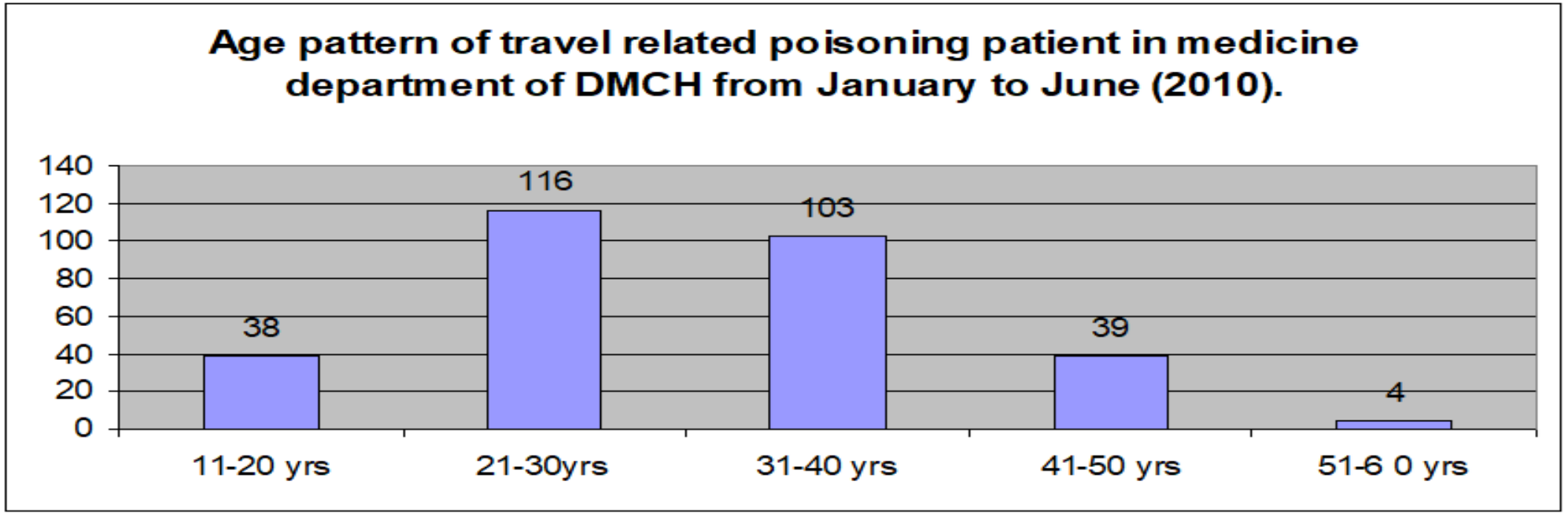
There is exclusively male sex pre-ponderance in induced poisoning cases, male: female= 98:2=49:1

Majority of the victims are at 21 to 30 years age group

Most of the victims had lost their valuables including money

Contd…

Mode and pattern of travel related poisoning



Mode and pattern of travel related poisoning

They may be linked with larger chain of miscreants and this needs to be identified by the *law-enforcing agencies* of government to disrupt the chain and to protect the people of being robbed off during journey.

These patients are admitted throughout the year but interestingly more during *summer* possibly people are usually thirsty due to excessive hot weather and easily deceived with an offer of cold drink from other person (Hospital records)

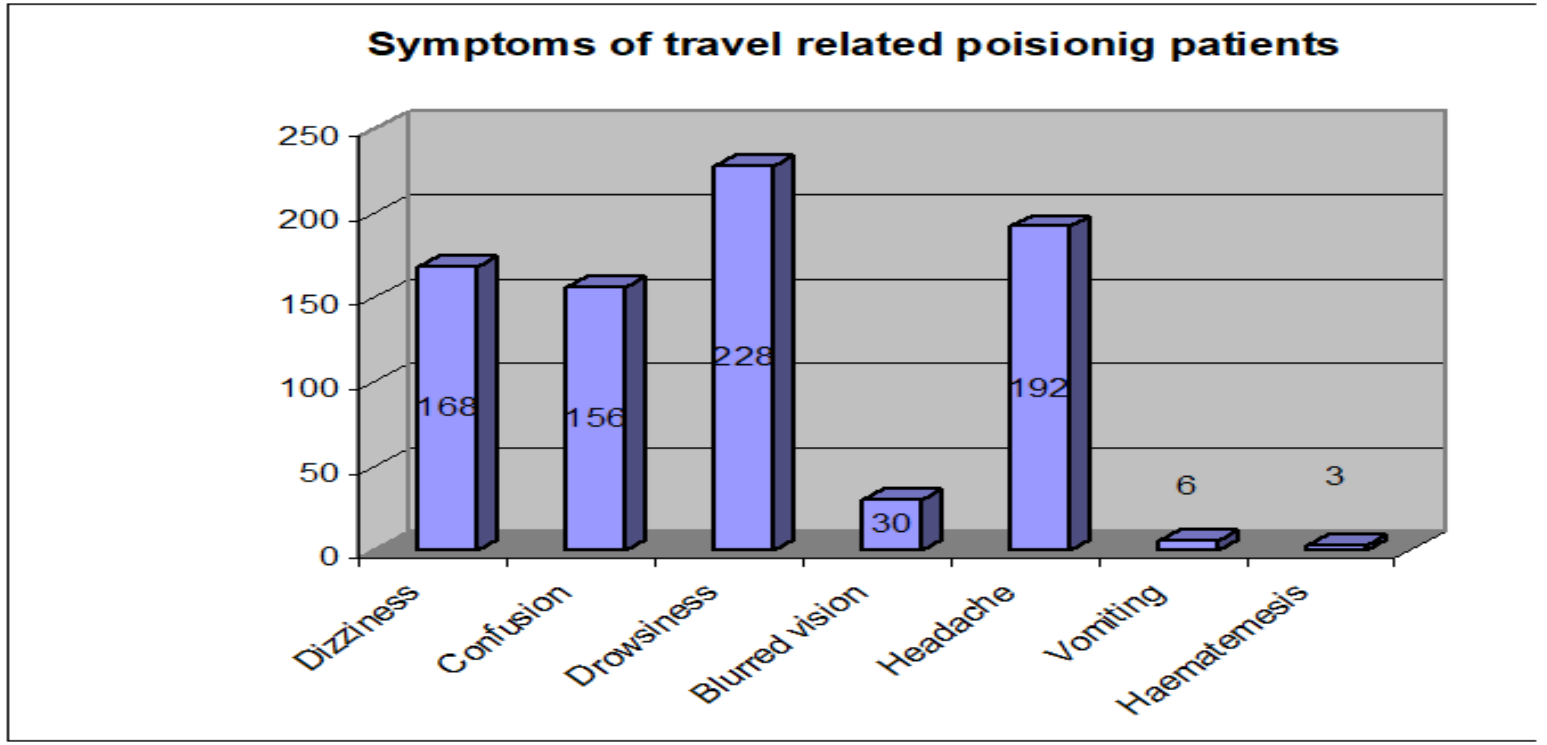
Clinical Features and Investigation

The interesting aspect of *change of pattern* of poisoning happened in the nature of patients of unknown poisoning from *Datura to sedative* which can be differentiated by skin condition, pupil size, relatively calm patient with uneventful recovery.

Majority of victims were unconscious within 30 minutes of time after ingestion of offered substance and remaining were unconscious within 60 minutes because hypnotics used were absorbed quickly from gut, acted rapidly on central nervous system and made the person stuporous.

Contd…

Clinical Features and Investigation



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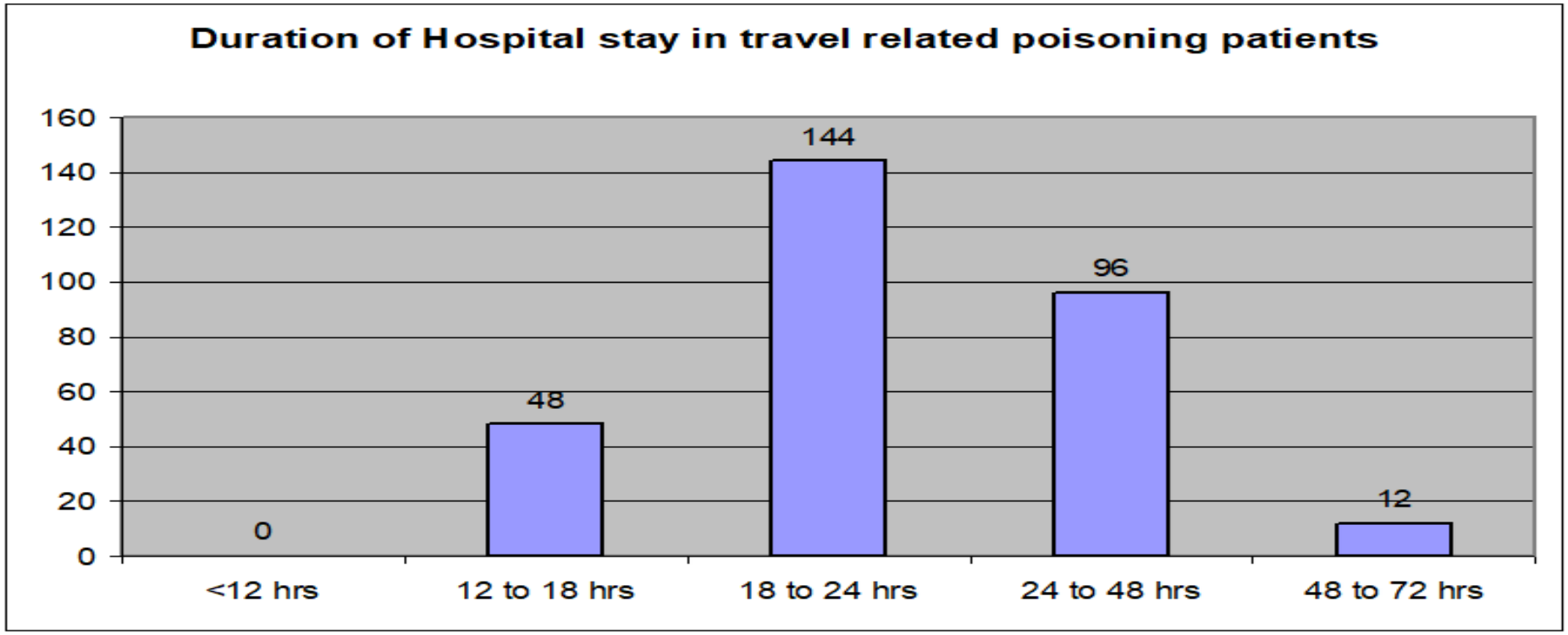
Management



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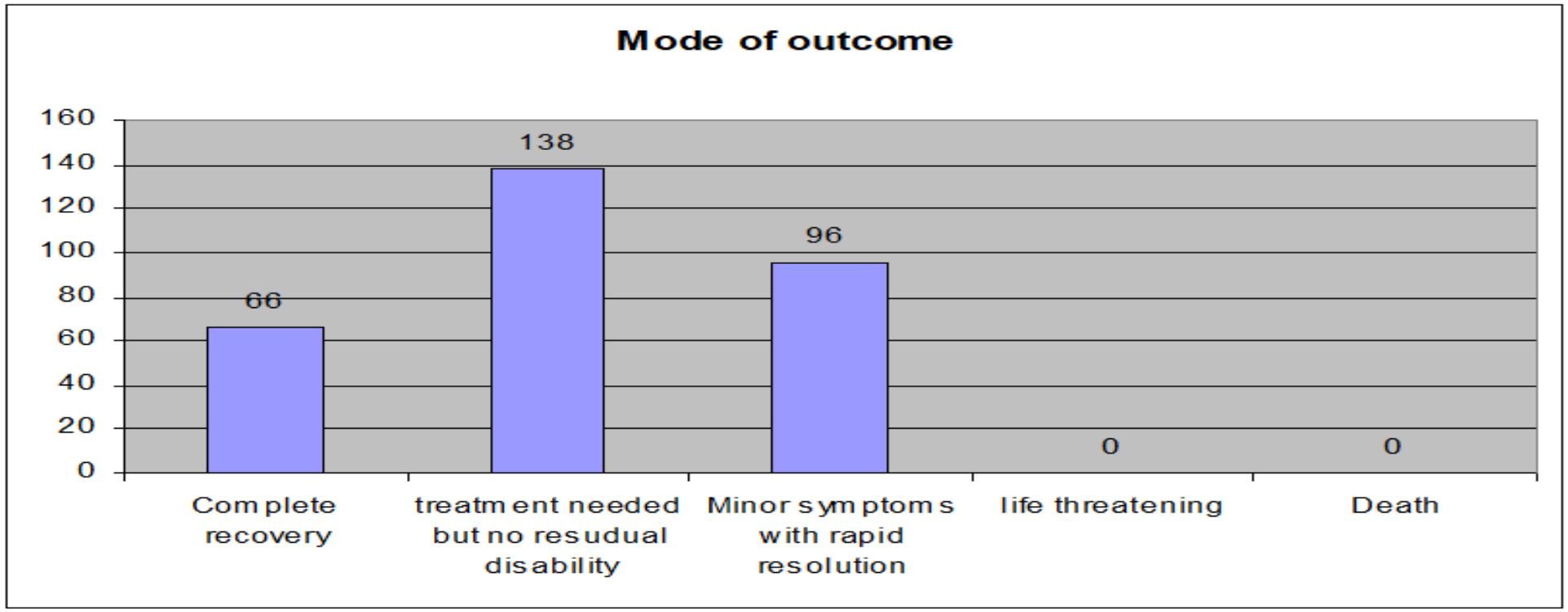
Management



suggestions

-commuter poisoning is an emerging public health threat in Bangladesh

-Public awareness be raised and school based educational programme should be emphasized regarding it’s consequences and accepting food from strangers .

-**Special measures be taken by hosp. admin. For urgent management of these unaccompanied victims.**

-Steps should be taken by law enforcing agencies to identify the offending agents and culprit by vigilance.

-Facilities for intensive care with artificial respirator, adequate drug supply and improving diagnostic method for chemical analysis.

-Awareness of public,media,police,driver,conductors can reduce incidents.

Acknowledgement….

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Associate Prof of medicine, SOMCH

Dr Taj Mohammed Khan

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Thank you all..