ELIMINATION OF UNNECESSARY INJECTION THROUGH HEALTH EDUCATION ON INJECTION SAFETY AND RATIONAL PRESCRIPTION AMONG PRIMARY HEALTH CARE WORKERS IN KATSINA STATE, NIGERIA.

SULEIMAN S.[1], SABITU K.[2], IDRIS S.H.[3]

[1, 2, 3]*Department of Community Medicine Ahmadu Bello University Teaching Hospital Zaria.*

ABSTRACT

Background: *Unnecessary injection is one of the contributory factors of unsafe injection, generation of additional injection waste hazards and transmission of blood borne pathogens the situation was assessed in this study among primary health care workers in Katsina State between February and July 2012.*

Objectives: *To determine the pattern of unnecessary injection prescription practice and to evaluate the effect of health education in improving rational injection prescription among health workers in Katsina State.*

Methodology: *A quasi experimental design was used to study 275 primary health care workers among the study group and control groups with 222 prescription slips selected randomly on exit from consultation rooms. Self administered questionnaires and observation checklists modified from WHO tool for injection safety assessment were pretested and administered to the study participants determined through sample size calculation and systematic sampling selection. Data collected was entered and analyzed using SPSS Version 17.*

Results: *The mean age of the workers was 38.2±8 years and 36.4±7.7 years among the study and control groups respectively. Most of the health workers practice prescription, the mean injection prescribed 49.0±38.7 pre intervention and 24.3±24.3 post intervention among the study group. Poly pharmacy with an average of 6.0 drugs pre intervention to 5.69 drugs post intervention remained among the workers. The mean injection prescribed reduced from 2.009±1.6 to 1.792±1.6 post intervention (p=0.001),most of the prescriptions issued by the study participants have significantly improved in writing full name of drugs, dose of medication, dose interval and legible hand writing (p<0.05). Use of generic name has improved to 52.3% post intervention and prescriber-patient communication also improved averagely in explaining to patient why oral drugs was better than injection and why injection was prescribed has improved to 84.4% and 89.6% post intervention significantly(p<0.05).*

Conclusion: *Unnecessary injection can be reduced through training intervention among health workers, the practice of polypharmacy need more studies in order find a lasting solution to the problem.*

Keywords: *Unnecessary Injection, Health Education, PHCWs.*
All Correspondence to: Dr Suleiman s. Department of Community Medicine Ahmadu Bello University Teaching Hospital Zaria Kaduna State, Nigeria (suleimansani@yahoo.com).

Introduction prescription

Injection is a medical procedure of introducing therapeutic substances into the body such as drugs, vaccines and contraceptives using needles and syringes. Injection is unnecessary if there is an alternative way of introducing the same therapy in form of tablets, syrup, ointments, inhalation, suspension drops and suppositories. An unnecessary injection is one where oral alternatives are available, where the injected substance is inappropriate or harmful, or where the symptoms or diagnosis do not warrant treatment by injection.[1]Frequent use of injections in our hospitals can lead to increase in the waste generated from injections. Irrational prescription of injection leads to overuse which could result into blood borne pathogens infection from one patient to the other when there is recycling/reuse or from patient to health worker if the action resulted into needle sticks injuries. Most often the used items are reused, sold or recycled because of their commercial benefits. Immunization are administered in most instances without an issued prescription order in writing, the age of a child or recipient of Immunization is what determines what dose of antigens to be administered to the baby. In routine medical care drugs use are initiated by collecting prescriptions from health workers who decided on behalf of their clients/patients what treatment plan is suitable for their patients.

Sometime such privilege makes health workers to misuse prescriptions and include unnecessary injections that have no therapeutic benefit above oral or topical administration of drugs. An estimate of 12 billion injections are administered yearly and most of the injections used in our hospital environment (95.0%) are for curative services and the remaining five percent (5.0%) for therapeutic services and most were found to be unnecessary.[1]

Unnecessary injection can increase the volume of waste generated in our hospitals which can be harmful to healthcare workers, the community and increase cost of managing the hospital services. Different reasons were found to influence the production of unnecessary prescriptions among health care practitioners. Some prescriptions were issued in order to satisfy clients psychologically in order to accept the health workers as persons treating them and sometime the patient put pressure on the prescribers to include injections in their treatment prescriptions.[2, 3,4] The reasons for prescribing injections were identified in some studies as: quick symptoms relief (83.0%), greater effectiveness (39.0%), lower frequency of side-effects (33.0 %) and patients satisfaction (22.0%). The most common complaints for which injections were given included infections (50.0%), malaria (44.0%), and gastroenteritis (44.0%) and generalized weakness (22.0%). [5]

Different studies have found different results in the rates of injections between male and female patient during visit to medical consultation rooms in Pakistan. Age sometime influences the rate of given injection to patients. Under five children (79.0%) received more injections than among older age groups (60.0 -76.0 %).[5,6] The most frequently injected drugs are antibiotics, vitamins, analgesics and antimalarial (quinine).[7,8] Nineteen percent of the prescriptions in Nigeria contained an injection and in Saudi Arabia the average number of injections served by physicians in primary health centre was 1.7 and among nurses was 25.5 per week and only physicians are allowed to write prescriptions.[9,10] In India more than eighteen percent of the prescriptions contained at least one injection.[11] Regional differences sometime exist in the practice of given prescriptions that include at least one injection. The private medical workers tends to give more injections to patients than those working in public hospitals.[12] The global effort in reduction of the burden of HIV/AIDS can make life better, safe and necessary injection can help in ensuring success toward such human survival strategies. The Millennium Development Goals (MDGs) goal 5 aimed at reducing the burden of HIV/AIDS, TB and Malaria by 2015.successful reduction of unnecessary injections in our health care will help toward achievement of Millennium goals.

Methodology:
A quasi experimental study was carried out among Primary Health Care Workers (PHCWs) in Katsina State. The study consists of Primary Health Care Workers from Dutsinma Health Zone: (D/ma, D/musa, Batsari, Kurfi and Safana LGAs). The Control group consists of Primary Health Care Workers from Malumfashi Health zone: (Malumfashi, Kankara, Bakori, Danja and Kafur LGAs). Baseline information on practice of injection prescription within 3 months prior to health education was collected among the respondents in the study and control groups using observation checklists were collected. The participants in the study group were then gathered at the local government chamber/conference Hall for health education intervention. Power points slides and projector with copies of Training manual on injection safety from the Fed Ministry of Health, WHO, USAID was used for the health education.[13] The control group respondents were not trained. Three months post intervention information was collected among the study and control groups. Similar tools were used for data collection at pre and post intervention respondents in both the control and the study groups. The Checklists (adapted and modified to answer objectives of the study) were pretested among PHCWs in Batagarawa and Katsina LGAs.[14]This was to test for consistency and correct errors and to determine the average time for completing each questionnaire. Necessary corrections were made on the checklists before final data collection. The questionnaires were self administered and the checklists were filled by the researcher by visiting the different health facilities were the respondents' works and observed the sample prescriptions on exit from consultation rooms. The completed questionnaires and checklists were entered into the computer and analyzed using SPSS Version 17. Frequencies were run to check for wrong entries and to affect data cleaning. The result was presented using tables and charts as well as appropriate statistical tests.

Sampling technique:
A total of 135 health workers from the study and 150 from the control groups were chosen from the list of workers working in health facilities from the selected LGAs. The number of health workers

selected was proportionate to the size of the population. Systematic random sampling was used to draw the required participants from each health facility. A total of 111 prescriptions were studied from each group. The prescriptions were selected using systematic random sampling. The sapling interval calculated was 4 and the first prescription was selected by choosing the fourth prescription that exit from the consultation room and the second one was the eighth person these continues until all the 111 prescriptions were observed.

Ethical Clearance:

Ethical clearance was obtained from the Katsina state Ministry of Health Ethical and operational research Advisory Committee.

Limitations:

1. Sharing of information between the study and control groups may not be absolutely avoided since movement of participants from one area to another may be beyond strict regulation in the study.
2. The participants may get information from the media or from other sources during the study period.

RESULTS

Table: 1. Age distribution of respondents

Age group (years)	Study group		Control group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
20-24	0.0	0.0	3	2.1
25-29	18.0	13.3	20.0	12.1
30-34	32.0	23.7	37.0	26.4
35-39	28.0	20.7	23.0	16.4
40-44	27.0	20.0	24.0	17.1
45-49	12.0	8.9	15.0	10.0
50-54	16.0	11.9	2.0	8.4
55-59	2.0	8.5	20.0	15.3
Total	135.0	100.0	150.0	100.0

Table 2: Socio-demographic characteristics of respondents

Socio-demographic characteristics	Study group n (%)	Control group n (%)	Test	df	p-value
Age (mean ±SD)	(38.2±8.0)yrs	(36.4±7.7)yrs	Z= -0.228	273	0.819
Sex :					
Male	117(86.7)	120(85.7)			
Female	18(13.3)	20(15.3)	χ^2=0.033	1	0.855
Total	135(100.0)	150(100.0)			
Marital status:					
Married	122(90.4)	128(91.4)			
Single	13(9.6)	12(8.6)	χ^2 = 3.576	1	0.059
Total	135(100.0)	150(100.0)			

Table 3: Practice of injection prescription among respondents

Prescribe injections	Study group		Control group	
	Pre intervention n(%)	Post intervention n(%)	Pre intervention n(%)	Post intervention n(%)
Yes:	129(95.6)	123(91.8)	123(87.9)	121(86.4)
No:	6(4.4)	11(8.2)	17(12.1)	19(13.6)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=5.262, df=1	p=0.022	χ^2=0.000, df=1	p=0.500

Table 4: Estimation of average number of injections prescribed per week among respondents

prescription	Study group		Control group	
	Pre-intervention n (%)	Post-intervention n (%)	Pre-intervention n (%)	Post-intervention n (%)
Mean number of injections per Week:	49.0±38.7	24.3±24.3	35.8±23.1	40.8±22.1
Test	Z=-7.297, df=134	p=0.000	Z=-2.570, df=139	p=0.010

Table 5: Pattern of drugs and injection prescription among respondent

Mean	Study group		Control group	
	Pre-intervention n=111	Post-intervention n=111	Pre-intervention n=111	Post-intervention n=111
Mean number of Drugs per prescription:	6.009±2.0	5.694±2.0	6.189±2.0	5.955±1.9
Test	Z=-2.752, df=110	p=0.006	Z=-2.345, df=110	p=0.019
Mean number of Injections per prescription :	2.009±1.6	1.792±1.6	1.918±1.6	1.838±1.6
Test	Z=-3.328, df=110	p=0.001	Z=-1.897, df=110	p=0.058
Mean number of tablets per prescription:	2.117±1.9	2.054±1.8	2.154±1.9	2.699±1.8
Test	Z=-1.003, df=110	p=0.316	Z=-0.720, df=110	p=0.472
Mean number of syrup per prescription:	1.694±1.8	1.613±1.7	1.748±1.7	1.739±1.7
Test	Z=-1.515, df=110	p=0.130	Z=-0.184, df=110	p=0.854
Mean number of ointments per prescriptions:	0.396±1.0	0.387±0.9	0.405±1.0	0.387±1.0
Test	Z=0.000, df=110	p=1.000	Z=0.000, df=110	p=1.000

Table 6 : Prescriptions issued by respondents without Omission of important component Features

Features of prescription not omitted.	Study group		Control group	
	Pre intervention n(%)	Post intervention n(%)	Pre intervention n(%)	Post intervention n(%)
Date of prescription:	105(94.6)	108(97.3)	101(91.0)	103(92.8)
Test	t=1.748, df=110	p=0.083	t=1.000, df=110	p=0.320
Full name of drug:	99(89.2)	107(96.4)	95(85.6)	99(89.2)
Test	t=2.923, df=110	p=0.004	t=2.028, df=110	p=0.045
Dose of medication recorded in mg, mills or tablets:	87(78.4)	98(88.3)	90(81.1)	92(82.9)
Test	t=3.479, df=110	p=0.001	t=0.815, df=110	p=0.417
Dose interval recorded:	96(86.5)	94(84.7)	90(81.1)	90(81.1)
Test	t=2.507, df=110	p=0.015	t=-2.625, df=110	p=0.010
Duration of treatment:	105(94.6)	111(100.0)	101(91.0)	107(96.4)
Test	t=2.507, df=110	p=0.015	t=1.920, df=110	p=0.057
Route of administration recorded:	87(78.4)	104(93.7)	81(73.0)	85(76.6)
Test	t=4.460, df=110	p=0.000	t=2.028, df=110	p=0.045
Legible hand writing:	91(82.0)	108(97.3)	104(93.7)	108(97.3)
Test	t=4.460, df=110	p=0.000	t=2.028, df=110	p=0.045

Table 7: Proportion of drugs prescribed in generic name among health workers.

Name of prescribed drugs	Study group		Control group	
	Pre intervention n(%)	Post intervention n(%)	Pre intervention n(%)	Post intervention n(%)
Use trade name:	83(74.8)	53(47.7)	99(89.2)	84(75.7)
Use generic name:	28(25.2)	58(52.3)	12(10.8)	27(24.3)
Total	111(100.0)	111(100.0)	111(100.0)	111(100.0)
Test	χ^2=22.132, df=1	p=0.000	χ^2=5.600, df=1	p=0.018

Table 8(a):Prescriber-patient communication among respondents

Type of communication	Study group		Control group	
	Pre intervention n(%)	Post Intervention n(%)	Pre intervention n(%)	Post intervention n(%)
Ask patients if they preferred injections or oral drugs:				
Yes	77(57.0)	102(75.6)	53(37.9%)	56(40.0)
No	58(43.0)	33(24.4)	87(62.1)	84(60.0)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=10.105, df=1	p=0.001	χ^2=0.000, df=1	p=0.250
Explain to patients dose interval for injections/drugs prescribed:				
Yes	117(86.7)	128(94.8)	130(92.9)	133(95.0)
No	18(13.3)	7(5.2)	10(7.1)	7(5.0)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=0.006, df=1	p=0.939	χ^2=1.136, df=1	p=0.287

Table 8(b): Prescriber-patient communication among respondents

Type of communication	Study group Pre intervention n(%)	study group Post intervention n(%)	Control group Pre intervention n(%)	Control group post intervention n(%)
Explain to patient amount (dose) of injection/drug prescribed:				
Yes	117(86.7)	127(94.1)	135(96.4)	135(96.4)
No	18(13.3)	8(5.9)	5(3.6)	5(3.6)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=0.994, df=1	p=0.319	χ^2=0.000, df= 1	p=1.000
Ever Explain to patient why oral drug is better than injections				
Yes	85(63.0)	115(84.4)	121(86.4)	116(83.5)
No	50(37.0)	21(15.6)	19(13.6)	23(16.5)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=16.681, df=1	p=0.000	χ^2=0.000, df=1.000	p=1.000
Explain reason why injection was prescribed:				
Yes	103(76.3)	121(89.6)	113(81.3)	103(76.3)
No	32(23.7)	15(10.4)	26(18.7)	32(23.7)
Total	135(100.0)	135(100.0)	150(100.0)	150(100.0)
Test	χ^2=8.500, df=1	p=0.000	χ^2=0.000, df=1	p=0.250

Discussion

Most of the health workers in Katsina State are between 30-34 years in both study and control groups and few of them are within 55-59 years. The mean age of the respondents was 38.2±8.0 and 36.4±7.7 years there was no statistical difference in the age of respondents in the two groups (p=0.819). Majority of the workers were men and married in both the study and control groups. Most of the respondents in the two groups do prescribe injections to their patients at pre and post intervention this is different from the finding in Saudi Arabia were only physicians write on prescription notes.[10] There was significant reduction in the practice among the study group post intervention (p=0.022). The mean number of injection prescribed per week among the study group and control group was (49.0±38.7) and (35.8±23.1) respectively (pre intervention). The volume of prescribed injections per week reduced significantly in the study group post intervention (see table 4). The mean number of injections per prescription among the study group has reduced significantly post intervention. This shows that training of health workers on injection safety has contributory effect in improving safe injection and can reduce the amount of unnecessary injections in our hospitals and the volume of injection waste has

reduced tremendously. However the practice in India was quite lower than what was obtained in this study.[11, 12]

Omission of certain components of prescription may cause an error at the point of dispensing the drugs. And this type of behavior can affect the quality of injection services and it may also have legal perspectives for or against the responsible health worker especially if there could be any reason for litigation. Recording the "Date of prescription" is an important feature of prescription that tells about the need to use the current treatment or not. In this study the proportion of prescriptions that contained date of medication were (94.6%) among the study group prior to intervention and (97.3%) post intervention. The findings in Pakistan was higher than this as all the prescriptions examined contained date of prescription (see table 6).[16]

Writing drug name in full avoid the difficulties faced in knowing the name of the drug to be administer to the patients. Some prescribers use certain abbreviations in drug like: chloroquine (CQ), paracetamol (PCM) and e.t.c. In this study the proportion of prescriptions with full name of drugs recorded in full were (89.2%) prior to intervention and (96.4%) post intervention the improvement was statistically significant (p<0.05). The finding in Lucknow Pakistan differed from what was obtained here as only (30.2%) of the prescriptions were written with full name of the drugs appropriately.[16]

Majority of the prescriptions (78.4%) in the study group contained dose of medication recorded in mills, mg, or tablets prior to intervention and this has improved to (88.3%). The difference was statistically significant. The finding in Pakistan was poorer than what was obtained here with only (42.7%) of the prescriptions contained clear instruction on medication doses (see table 29).[13] The proportion of prescriptions that recorded dosage interval such as six hourly, eight hourly and twelve hourly was (86.5%) prior to intervention and this diminished to (84.7%) post intervention, compared to what was obtained in Pakistan (42.7%) was lower than the result here (see table 6).[16]

Most of the prescriptions prior to intervention contained duration of medication recorded and all the prescriptions examined post intervention contained clear statement on prescribed duration of the treatment. A different and very low proportion was obtained in Pakistan with only

(3.5%) were recording duration of medication (see table 6).[16]

Route of drug administration was specified in (78.4%) of the prescriptions pre intervention and post intervention significant improvement in the practice was recorded (p<0.05). The finding in Pakistan was on the lower side compared to this one as only (4.5%) of the prescriptions specified the route of administration such as I m, I v or oral (see table 6).[16]

A clear hand writing on prescription reduces the chances of given wrong drug to patient as in overdose or under dose amount and would remove the confusion of given different drug to wrong recipient. Legible hand writing was used to write (82.0%) of the prescriptions prior to intervention and this has improved to (93.7%) post intervention. In Pakistan two different results were obtained where only (51.7%) of the prescriptions among primary health care workers were written with legible hand writing and similar proportion to the one in this study was obtained at the tertiary level (95.2%) (See table 6).[16]

Prescribing more than two drugs per prescription is what constitutes poly pharmacy, [16] and this could result into drugs interaction. The mean number of drugs prescribed among the study group was (6.0±2.0) prior to intervention and this has reduced significantly to (5.7±2.0) post intervention. Poly pharmacy remained a big problem in prescription practice among health care workers in Katsina state as it was also found in other communities locally and across the continents. The mean number of drugs prescribed in Pakistan, Benin City, North west Nigeria (Sokoto and Kebbi) and Lagos (Onikan and Randle) were lower than what was obtained in this study .[15, 16, 17] Following the intervention the mean number of tablets and ointments has reduced but there was no significant change (p>0.05) (see table 5).

Communication between patient and prescriber is an important way of providing quality health care to patients. There were significant improvements in areas of : Asking patients if they preferred injections or oral drug and in the proportion of respondents that: ever explained to patient why oral drugs were better than injections especially when it comes to easy administration, access (cost), and convenience with less dependence on health workers most of the time for administration. On average (73.9%) patient-prescriber communication occurred prior to intervention and post intervention (87.7%) of such encounters transcended. The result obtained in

Sokoto and Kebbi was different to what was obtained in this study as only (16.4%) of patient prescriber communication related to prescription was obtained among prescribers in Sokoto and Kebbi (see table 8a &8b).[18]

Conclusion

Training of Health workers on injection safety and rational prescription has the potential of reducing the amount of unnecessary injections in Katsina State. The practice of prescribing more than one drug per prescription remained a problem that may require further investigation.

Acknowledgement:

We wish thank Almighty God for supporting us in the study and Dr Abduljalil AU(DPRS), and Dr Halliru Idris(DPH) of Katsina State Ministry of Health. The Management of State primary health care Agency, the M&E officers in the LGAs involved in this Study and especially Mallam Ahmed who assisted in preparing the manuscript on computer.

References

1. Simonsen L, Kane A, Lloyd J, Zaffran M, Kane M. Unsafe injections in developing world and transmission of blood borne pathogens: a review. *Bull World Health Organ* 1999; **77**(10):789-799.

2. Kane A., Lloyd J., Zaffran M., Simonsen L., Kane M. Transmission of hepatitis B, hepatitis C, and human immunodeficiency viruses through unsafe injections in developing world: model based regional estimates. Bulletin of the world Health Organization, 1999; 78:801-807.

3. Reeler A.V. Anthropological perspectives on injections: a review. Bulletin of the World Health Organization. 2000. 78(1):135-163.

4. Neibuhr H.F., Whitfield M.J. injections and patients satisfaction in Zulu-speaking patients. South African Family Practice. 2002; 25(6).

5. Aamir J.K., Stephen P.l. Fariyal F., Anita K., Saima O. et al. Unsafe injections and the Transmission of hepatitis B and C in a Periurban Community in Pakistan. Bulletin of the World Health Organization.2000; 78(8): 956-963.

6. Naveed Z.J. Saeed A. Yvan JFH. Injection use in two districts of Pakistan: implications for disease prevention. International journal for Quality in Health Care. May 2005; 18(5):401-409.

7. Greenhalgh T. Drug prescription and self-medication in India: an exploratory survey. Social science and medicine. 1987; 25:307-318.

8. Guyer B. Candy D. injectable antimalaria therapy in tropical Africa; iatrogenic disease and waste medical resources. Transactions of the royal society of tropical medicine and Hygiene. 1979; 73:230-232.

9. Akande T.M., Ologe M.O. Prescription pattern at a secondary Health facility in Ilorin, Nigeria. Annals of African medicine. 2007; 6(4):186-189.

10. Mahafouz A.A., Abdelmoneim., Khan M.Y.,Daffalla A.A., Diab M.M. et al. injection safety at primary health care level in south-western Saudi Arabia. Eastern Mediterranean Health Journal.2009; 16(2):443-450.

11. Murhekar M.V., Rao R.C., Ghosal S.R., Sehgal S. C. Assessment of injection related practices in a tribal community of Adaman and Nicobar Islands India .Public Health. July 2005; 119(7): 655-658.

12. Rajaskaran M. Sivagnanam G. Thirumalaikolundusubramainam P., Namasivayam K, Ravindranath C. Injection practices in southern part of India. Public Health. May 2003; 118(3).

13. Training manual on injection safety in the Context of infection prevention and Control for Health care Personnel. Federal Government, WHO, USAIDS, MMIS, US President. May 2007; 1(1):1-160.

14. World Health Organization (WHO) Department of vaccines and Biological. Tool for the assessment of injection safety. World Health Organization. Geneva (WHO/V&B/01.30 and WHO/BCT/01.02). 2001; 1-28.

15. Ranjeeta K. Idris MZ. Vidya B. Arish K. Monica A. Shivendra KS. Assessment of prescription pattern at the public health facilities of Lucknow district. Indian J pharmacol. Dec.2008; 40 (6): 243-247.

16. Erah PO., Olumide GO., Okhamafe AO., Prescribing practices in two health care facilities in Warri, Southern Nigeria: A comparative study. Tropical Journal of Pharmaceutical Research.2003; 2:185-182.

17. Akinyede AA., Mabadeje AFB., Aliu MO. A comparative study of patterns prescription of antibiotics in two health centres in Lagos. Journal of the Nigerian Association of Infection Control. 2000; 3:20-23.

18. Ibrahim MTO. Physician's prescribing behavior in two tertiary health care facilities in north western Nigeria. Analysis of 518 prescriptions. Sahel Medical Journal.2004; 7:116-118.