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Review article

Survey, assessment & development of quality standards and parameters for brand and generic drugs available in the market

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ABSTRACT

Quality can be defined as the suitability of the goods or service to the determined qualifications. Both the in process and finished product quality control tests help to ensure the total quality of the product. The present work deal's with survey, assessment and development of special system for such quality specification for the medicines. The specification limits of the finished product at the time of batch release are set by the marketing authorization applicant such that the specifications proposed at the end of shelf life are guaranteed and are established on the basis of a critical detailed review of the data gathered from the batches analyzed and there is also a need of after-market survey and quality work done to standup to a brand image power directly to the masses. Since the markets have opened up due to globalization it is necessary for a product to comply with the standards of the place where it is to be marketed and will open constant quality acceptance of the product throughout the globe.

Keywords: Quality, Globalization, Brand, Shelf –life, Recall.

INTRODUCTION

India is a vast country with diverse and complex sociocultural, economic and political fabric. Notwithstanding this complexity, within a few decades since independence in1947, the nation has become self-sufficient in catering to the medicine needs of its people and transformed itself from a high medicine price nation to one with relative below drug prices. However, contemporary challenges like industrial policy reform, economic liberalization and globalization, decontrol measures, and, above all, the World Trade Organization agreement obligations, tend to make the cherished matter of equitable access to essential medicines elusive. The issue of inequitable access and affordability of essential medicines is one of global concern and is being increasingly voiced in India in the backdrop of the ongoing economic changes. Therefore it is a global obligation to ensure availability and affordability of essential medicines.

Worldwide, there are a multitude of medicines with a multitude of prices. The same medicine has different prices depending upon the source from which it is procured, the form in which it is marketed (e.g. brand or generic, oral or parenteral, course of treatment pack or bulk pack, etc.), the taxes and duties that are levied by governments and the facilities from which it is procured by patients. It is an extremely complex task, whether for individuals or for governments, to ascertain the optimum availability and best prices for medicines. Therefore it is necessary to monitor these parameters on a regular basis. WHO and HAI have collaborated to develop a methodology for measuring medicines prices and availability. This has already been field tested in a number of countries and is being refined in the process.

Studies are now being undertaken in India, following this methodology, to provide the baseline data for assessing medicine availability and affordability in the country. The current study on medicine prices in West Bengal is a component of a multi-state survey. Chennai, Haryana, Karnataka, Maharashtra and Nagpur are

the other states or regions where similar surveys have been undertaken simultaneously. The availability and pricing of essential medicines in the state of Rajasthan has been assessed earlier following the same methodology. more to lose in the sense that they risk losing their credibility in the eyes of the consumer.

On the human side, every year many lives are lost to counterfeit drugs and medicines disease groups never assessed in pre-market clinical trials.

Some countries lack of systematic prospective monitoring of drugs once they are marketed means that adverse drug reactions (ADRs) are often not uncovered until years after a drug is on the market [1, 2].

MATERIALS &METHODOLOGY

Double distilled water, methanol,0.1N sodium hydroxide, 3 brands of tab (paracetamol) & cap (amoxicillin), 3 brands of suspension (aluminium hydroxide & magnesium hydroxide),3 brands of syrup (dextromethorphan hydrobromide & chlorpheniramine maleate),filter paper,50 & 100ml beaker,1ml and 5ml pipette, silica beads, separating funnel, std. samples of amoxicillin &paracetamol, dil. HCl, Conc. HNO3, pot. dihydrogen phosphate , NaOH pellets, pycnometer, silver nitrate all chemicals used were of analytical grade (Merck).

Survey method or techniques, strategies, steps & indicators and report format with checklist

Pharmaceutical indicators for monitoring and assessment

Result is that drugs with unacceptable harm/benefit ratios remain on the market for prolonged periods of time and are left exposed to these unanticipated risks. It seems counterintuitive that just as a new drug enters the market and its use increases exponentially, its effects and patterns of use are no longer systematically monitored.

Survey Planning, design, and Preparation on Indicator-based monitoring strategies

Pharmaceutical components in Level I indicators

Level -II indicators

Selecting public health facilities & Making random selections

Selecting private drug outlets

Sampling dosage form & patients for data collection

Preparing the survey for selection and identification

Tailoring the survey reports to state wise situations by choosing key medicines model list, selecting tracer conditions and identifying treatment protocols.

Selecting & identifying basket of key medicines or indicator medicines.

Identifying medicines to be considered as antibiotics, antipyretics, antacids & cough syrups etc. Identify standard criteria for adequate labeling and patient knowledge

Identifying unit price of medicines for obtaining global and regional drug prices [paid by the patient or paid by the facility]

Data processing, analysis and reporting. Computation of Quality of data and information

Collection, analysis and interpretation of indicators.

Limitations of the Level II facility survey

Indicator measure for Level II facility indicators

Performance standards for Level II facility indicators

Written report.

Tablets (Evaluation)

Moisture contents of the tablets

The 10 tablets were pre weighted and beads of silica gel(blue) completely were dried in hot air oven at 100C for 3-4 hrs and weighted. Then they were kept in an container i.e,dessicator for 24 hrs and weighted again.the moisture content % was find out by this formula [wt. of silica kept after with tabs_wt. of silica kept before with tabs/wt. of silica before kept with tabs* 100] the amount should not be more than 0.5% as specified in the monograph.

Thickness of the tablets

The thickness of the tablets were recorded in mm using vernier caliper. The caliper jaws are adjusted and then 10 tablets one by one are introduced inside the jaws of the caliper, then the divison adjustment is made and the point where the jaws tip just touches give the reading then the avg. reading is taken and data is calculated

Preparation of std. solution of paracetamol

Weigh accurately a quantity of the powder containing about 100mg of Paracetamol, add 50 ml of 0.1 M sodium hydroxide, dilute with 50 ml of water, shake for 15 minutes. Mix & filter. now take 10ml of the filtrate and to the 10.0 ml of the resulting solution add 10 ml of 0.1 M sodium hydroxide, dilute to 90.0 ml with water and mix Measure the absorbance of the resulting solution at the maximum wavelength.

Assay of active ingredients (according to I.P)

Weigh and powder 20 tablets. Weigh accurately a quantity of the powder containing about 0.15 g of Paracetamol, add 50 ml of 0.1 M sodium hydroxide, dilute with 50 ml of water, shake for 15 minutes and add sufficient water to produce 100.0 ml. Mix, filter and dilute 10.0 ml of the filtrate to 100.0 ml with water. To 10.0 ml of the resulting solution add 10 ml of 0.1 M sodium hydroxide, dilute to 100.0 ml with water and mix Measure the absorbance of the resulting solution at the maximum at about 247 nm . Calculate the content of C8H9NO2 taking 715 as the specific absorbance at 247 nm. The tablet brands were taken marked as A,B&W respectively.

Weight variation of uncoated tablets (according to USP)

The weight variation of the tablets can be measured by weighing 20 each individual tablets and determining the percent difference from the intended amount. Guidelines in the USP 24/NF19 Supplement 1 indicate that each tablet "shall be not less than 90% and not more than 110% of the theoretically calculated weight for each unit.

$$\text{Highest weight variation} = \frac{\text{Highest weight} - \text{Average weight}}{\text{Average weight}} \times 100$$

$$\text{Lowest weight variation} = \frac{\text{Lowest weight} - \text{Average weight}}{\text{Average weight}} \times 100$$

Average mass of tablet	Deviation %	Number of tablets
less than 80 mg	±10.0	minimum 18
	±20.0	maximum 2
80 mg to 250 mg	±7.5	minimum 18
	±15.0	maximum 2
more than 250 mg	±5.0	minimum 18
	±10.0	maximum 2

Hardness test

The 10 tablets are tested for hardness by Pfizer hardness tester, the tablets are crushed under pressure of kg/cm3 and the avg. value of the tablets is cal. the range should not be more than 20kg/cm3 for oral tablets.

Disintegration test

Operate the apparatus using water as the immersion fluid unless another liquid is specified and maintain its temperature at 35-39 °C. At the end of the specified time, lift the basket from the fluid and observe the dosage units: all of the dosage units have disintegrated completely. If one or two dosage units fail to disintegrate, repeat the test on 12 additional dosage units. The requirements of the test are met if not less than 16 of the 18 dosage units tested are disintegrated.

Friability test

The friability test is done using a friabilator,20 tabs are weighted=w1.put these tablets into the friabilator and adjust the instrument at 100rpm(25rpm for 4 minutes),weight the tablet which are intact=w2,then the % loss is calculated. It must be less than or equal to 1%.

$$f = \left(1 - \frac{w}{w_0}\right) \times 100$$

where W o and W are the weights of tablets before and after the test [3, 4].

Dissolution test (according to international pharmacopoeia)

The apparatus USP type II "Paddle" is used for dissolution and medium is Phosphate buffer ,pH-5.8. At first 900ml of dissolution medium was placed in bath container. The tablet was introduced in to the bath container, the paddle was rotated at 50RPM up to 30 minutes.5ml of sample solution was withdrawn from batch container and again 5ml of fresh dissolution medium was replaced into the bath container to maintain the sink condition.

Thus the sample withdrawn within the specified time intervals such as 5,10,15,20 & 30 minutes. were measured at maximum at about247nm against the blank using spectrophotometer. The absorbance values were noted

Capsules

Moisture contents of granules and shell.

The 10 capsules were pre weighted and beads of silica gel(blue) completely were dried in hot air oven at 100C for 3-4 hours and weighted. Then they were kept in an container i.e, desiccator for 24 hours and weighted again. the moisture content % was find out by formula.

[wt. of silica kept after with tabs-wt. of silica kept before with tabs/wt. of silica before kept with caps*100]

this technique is developed and can be used if there is no moisture analyses. and the amount should not be more than 0.5%.as specified in the monograph. for capsules either the capsule as whole can be tested or separately the drug and the shell moisture can be determined also.

Preparation of std. solution of amoxicillin trihydrate

Weigh accurately a quantity of about 10 mg of amoxicillin, add about 80 ml of the solvent(water) mixture and dissolve by shaking for 15 minutes and mixing if necessary, with the aid of ultrasound. Dilute to 100.0 ml with the solvent mixture and filter. Then take 10ml of this filtrate and dill with 50 ml solvent to get a final resulting solution. Use this solution within 6 hours. The capsule brands were taken marked as C, D &X respectively. Calculate the specific absorbance of the content at max wavelength.

Assay of active ingredients (according to I.P)

Weigh accurately a quantity of the mixed contents of 20 capsules containing about 100 mg of amoxicillin, add about 80 ml of the solvent(water) mixture and dissolve by shaking for 15 minutes and mixing if necessary, with the aid of ultrasound. Dilute to 100.0 ml with the solvent mixture and filter. Use this solution within 6 hours. The capsule brands were taken marked as C, D &X respectively, calculate the content at 272nm.

Weight variation of capsules (according to international pharmacopoeia)

Weigh 20 intact capsules individually, and calculate the average mass. The mass of each capsule should be within ±10% of the average mass. If all the capsules do not fall within these limits, weigh the 20 capsules again, taking care to preserve the identity of each capsule, and remove the contents as completely as possible.

Weigh the emptied shells individually and calculate for each capsule the net mass of its contents by subtracting the mass of the shell from the gross mass. Determine the average net content from the sum of the individual net masses. Then determine the difference between each individual net content and the average net content.

Deviation of individual net mass from the average net mass should not exceed the limits given below

Size of capsules

The size of the capsules were recorded in mm using verniercaliper, care should be taken that the caliper jaws don't squeeze the top and the lower body part of capsule. The caliper jaws are adjusted and then 10 capsule one by one are introduced inside the jaws of the caliper, then the division adjustment is made and the point where the jaws tip just touches give the reading then the avg. reading is taken and data is calculate.

Disintegration test

Place one dosage unit in each of the six tubes of the basket and if specified add a disc. Operate the apparatus using water as the immersion fluid unless another liquid is specified and maintain its temperature at 35- 39 °C. At the end of the specified time, lift the basket from the fluid and observe the dosage units: all of the dosage units have disintegrated completely. If one or two dosage units fail to disintegrate, repeat the test on 12 additional dosage units. The requirements of the test are met if not less than 16 of the 18 dosage units tested are disintegrated [5, 6].

Dissolution test (according to international pharmacopoeia)

The apparatus USP type I "Basket" is used dissolution medium distilled water,Ph-6.8At first 900ml of dissolution medium was placed in bath container. The tablet was introduced in to the bath container, the paddle was rotated at 100 RPM up to 1 hr.5ml of sample solution was withdrawn from batch container and again 5ml of fresh dissolution medium was replaced into the bath container to maintain the constant volume.

Thus the sample withdrawn within the specified time intervals such as 5,10,20,30,40,50,and 60 minutes. The obtained sample solutions optical densities were measured at maximum at about 272nm against the blank using spectrophotometer. The absorbance values were noted

Suspension pH

The sample of the suspension was taken in a 50 ml beaker cleaned and dried before properly measuring the ph, the ph was measured using meter Toledo digital ph meter.

Viscosity

The viscosity of the suspension was determined by first finding the specific density with pycnometer and the known and unknown liquids the known liquid was taken as water with unknown liquid as the syrup sample. then the viscosity found out is the kinetic viscosity which is cal. to find out the dynamic viscosity.

$v = \mu / \rho$

where v = kinematic viscosity, μ = absolute or dynamic viscosity, ρ = density.

Sedimentation ratio

Determine the sedimentation ratio of each suspension. a sample of aluminium hydroxide was prepared and compared with sample suspension. Shake the suspension vigorously making sure all of the particles are uniformly suspended, and note the time. Observe the boundary between the sediment and the supernatant and record the time it takes for the boundary to pass each 10 ml graduation until the volume of sediment has reached 30 ml. The best way to observe the boundary is to view it directly in front of a light source. You might try viewing it with sunlight from the windows as your light source. You should note whether there is a clear and distinct boundary or no obvious boundary. Record the data

Plot the volume of sediment vs. time and draw the best straight line. The slope will be equal to the sedimentation rate.

Redisperse and allow each suspension to sit undisturbed for 24 hours. Then, determine and record the final volume of sediment.

Estimate the degree of caking in each system. After allowing the suspensions to sit for 3 or 4 days, determine the number of times the bottle must be inverted to re suspend all of the particles some suspension may take 15-30 days for observation.

The sedimentation volume, F, is the ratio of the equilibrium, volume of the sediment , Vu, to the total volume of the suspension

, Vo Thus, F=Vu/Vo

Weight per ml

Determine the weight of empty, dry pycnometer m0.

Fill about 1/3 of pycnometer volume with objects made of examined material (glass beads or small metal pieces as directed by the teacher) and measure the weight m1.

Add water such that pycnometer as well as capillary hole in the stopper is filled with water. Dry the spare water that leaks through the capillary hole with a filter paper and measure total weight m2.

Empty pycnometer and filled it with distilled water only. Use the filter paper to dry the spare water again and measure the weight m3.

Empty pycnometer. Rinse it once with a liquid whose density you are going to determine next. Fill pycnometer with the liquid as previously and measure the weight m4.

Repeat point 5. for several different liquid materials.

Clean pycnometer carefully after finishing the experiment. Rinse it with distilled water and let dry.

Measure the laboratory temperature t, which determines the temperature of examined liquids and solid objects [7, 8].

Syrup pH

The sample of the syrup was taken in a 50 ml beaker cleaned and dried before properly and the pH was measured using meter Toledo digital pH meter.

Viscosity

The viscosity of the syrup was determined by first finding the specific density using pycnometer and the known and unknown liquids the known liquid was taken as water with unknown liquid as

the syrup sample. then the viscosity found out is the kinetic viscosity which is cal. to find out the dynamic viscosity.

$$v = \mu / \rho$$

Where v = kinematic viscosity, μ = absolute or dynamic viscosity, ρ = density [9, 10].

Sugar concentration

The conc. of the sugar was found out by finding out the viscosity of the sample and then comparing the viscosity with the standard brix of various liquids. The range of the sucrose falling under the particular brix for the particular viscosity of the syrup sample was thus calculated.

Weight per ml

Determine the weight of empty, dry pycnometer m0.

Fill about 1/3 of pycnometer volume with objects made of examined material (glass beads or small metal pieces as directed by the teacher) and measure the weight m1.

Add water such that pycnometer as well as capillary hole in the stopper is filled with water. Dry the spare water that leaks through the capillary hole with a filter paper and measure total weight m2.

Empty pycnometer and filled it with distilled water only. Use the filter paper to dry the spare water again and measure the weight m3.

Empty pycnometer. Rinse it once with a liquid whose density you are going to determine next. Fill pycnometer with the liquid as previously and measure the weight m4.

Repeat point 5. for several different liquid materials.

Clean pycnometer carefully after finishing the experiment. Rinse it with distilled water and let dry.

Measure the laboratory temperature t, which determines the temperature of examined liquids and solid objects. where mH2O is experimentally determined weight of water (empty pycnometer weight subtracted) and We repeat the procedure for the liquid with unknown density ρL and determine its weight mL (measured weight minus weight of empty pycnometer) [11, 12].

CONCLUSION

The present survey on the availability, pricing and affordability of medicines in

Jackson D, Acharya Arnab, Anne Mills, 2011. An Assessment of the West Bengal has attempted to obtain reliable data on these aspects, limiting itself to a select basket of essential medicines. It has shown that medicines that are obtained from public hospitals free of cost by patients are procured economically, but the overall availability in the public sector is disheartening and needs immediate redress. Medicines are readily available from private retail counters but this comes at a price higher than international reference prices, with some brand premium for many items but quality is also an important factor that determines the safety and good quality medicines to the patients which are available in the market. Standard treatments are mostly affordable, provided that the earning member of a family draws minimum daily wages at rates specified by the government. The study has not covered all therapeutic categories or all sectors that distribute medicines to the people. Nevertheless, the results that have been obtained can serve as baseline for future studies and point to issues that need further investigation or rectification.

REFERENCES

1. Varun RV, Venkateshwarlu L, 2010. Solubility enhancement techniques. Int. J. Pharm. Sci. Rev. Res. 5(1), Pages 28-39.
2. Purwa J, chhrish G, 2010. Solubility enhancement techniques with special emphasis on hydrotrophy. Int. J. Pharm. Res. 1(1), Pages 34-45.
3. Meera CS, 2010. Review on various techniques of solubility enhancemen of poorly soluble drugs with special. J. Pharm. Res. 3(10), Pages 2494- 2501.
4. Anuj K, Sangram KS, 2011. Review on solubility enhancement techniques for hydrophobic drugs. Int. J. Comp. Pharm. 2(3). Pages 25-36.
5. Glenn GM, Kenney RT, Ellingsworth LR, 2003. Transcutaneous immunization and immunostimulant strategies: capitalizing on the immunocompetence of the skin. Expert Rev Vaccines. 2, Pages 253–267. Doi: 10.1586/14760584.2.2.253.
6. Frey WH 2nd, Liu J, Chen X, et al. 1997 Delivery of 125 I-NGF to the brain via the olfactory route. Drug Deliver 4, Pages 87-92.
7. Lochhead JJ, Thorne RG. 2012 Intranasal delivery of biologics to the central nervous system. Adv Drug Deliv Rev. 15; 64 (7), Pages 614-28.
8. Schaefer ML, Bottger B, Silver WL, Finger TE. 2002 Trigeminal collaterals in the nasal epithelium and olfactory bulb: a potential route for direct modulation of olfactory information by trigeminal stimuli. J Comp Neurol. 12; 444 (3), Pages 221-226.
9. Baker JT, Borris RP, Carte B, 1995. Natural products drug discovery and development: new perspectives on international collaboration. Journal of Natural Products. 58, Pages 1325-1357.
10. Robert A. Freitas, 2005. Current Status of Nanomedicine and Medical Nanorobotics. Journal of Computational and Theoretical Nanoscience. 2, Pages 1–25. Doi: 10.1142/9789812835581_0001.
11. Mahesh Chand Meena, Vidya Patni, 2008. Isolation and Identification of Flavonoid Quercetin from Citrullus colocynthis (Linn.) Schrad. Asian J. Exp. Sci. 22, Pages 137-14.
12. Stella V, Borchardt R, Hageman M, Oliyai R, 2007. Biotechnology: Pharmaceutical Aspects. Edition, vol 5(part 2), New York: Springer, Pages 157-215.