

# TABLE OF CONTENTS

<b>Abstract</b>	<b>i-ii</b>
<b>Declaration</b>	<b>iii</b>
<b>Certificate of the Supervisor</b>	<b>iv</b>
<b>Acknowledgement</b>	<b>v</b>
<b>List of Tables</b>	<b>x-xi</b>
<b>List of Figures</b>	<b>xii</b>
<b>List of Publications</b>	<b>xiii</b>
<b>1. Introduction</b>	<b>1-10</b>
1.1 General Introduction	1
1.2 Preliminaries	1
1.3 Brief historical overview	5
1.4 Objectives	8
1.5 Organization	9
<b>2. New quasi Poisson-Lindley (NQPL) distribution: Properties and Applications</b>	<b>11-27</b>
2.1 Introduction	11
2.2 Derivation of NQPL distribution	12
2.3 Graphical Representations	13
2.4 Distributional Properties	14
2.4.1 Shape of probability function	14
2.4.2 Moments	14
2.4.3 Skewness and Kurtosis	16
2.4.4 Index of dispersion and Co-efficient of Variation	17
2.4.5 Probability recurrence relation	18
2.4.6 Expression for factorial moment	19
2.5 Zero modified new quasi Poisson-Lindley (ZMNQPL) distribution	19
2.5.1 Recurrence relation for probabilities	20

2.5.2	Recurrence relation for factorial moment generating function	20
2.6	Estimation of parameters	21
2.7	Goodness of fit	23
2.8	Conclusion	27
<b>3</b>	<b>Size-biased new quasi Poisson-Lindley distribution</b>	<b>28-42</b>
3.1	Introduction	28
3.2	Derivation of SBNQPL distribution	30
3.3	Graphical representations	31
3.4	Statistical properties of SBNQPL distribution	33
3.4.1	Shape of probability function	33
3.4.2	Moments and related measures	33
3.4.3	Recurrence relation for probabilities of SBNQPL distribution	34
3.4.4	Recurrence relation for factorial moment generating function	36
3.4.5	Index of dispersion and co-efficient of variation	36
3.5	Estimation of parameters	37
3.5.1	Method of moments (MoM)	37
3.5.2	Method of maximum likelihood (MLE)	38
3.6	Goodness of fit	39
3.7	Conclusion	42
<b>4</b>	<b>Generalized two-parameter Poisson-Lindley (GTPL) distribution</b>	<b>43-57</b>
4.1	Introduction	43
4.2	Derivation of GTPPL distribution	44
4.3	Graphical representations	45
4.4	Shape of probability function	48
4.5	Recursive expression of GTPL distribution	48
4.5.1	Probability generating function	48
4.4.3	Factorial moment generating function	49
4.4.4	Cumulant generating function	50
4.6	Moments of GTPL distribution	50
4.7	Skewness and Kurtosis	51
4.8	Size biased generalized two-parameter Poisson-Lindley	51

(SBGTPPL) distribution		
4.8.1	Probability generating function	52
4.8.2	Factorial moment generating function	52
4.9	Estimation of parameters	52
4.9.1	Method of moments (MoM)	53
4.9.2	Method of maximum likelihood (MLE)	54
4.10	Applications of GTPL distribution	55
4.11	Conclusion	57
<b>5</b>	<b>A comparative study on some zero-truncated distributions</b>	<b>58-71</b>
5.1	Introduction	58
5.2	Zero--truncated Poisson-Lindley distribution	59
5.2.1	Recursive expressions for probabilities	59
5.2.2	Recursive expression for moments	60
5.2.3	Recursive expression for factorial moment generating function	61
5.2.4	Index of dispersion and co-efficient of variation	61
5.3	Zero--truncated new generalized Poisson-Lindley distribution	62
5.3.1	Probability generating function	63
5.3.2	Recursive expression for moment generating function	63
5.3.3	Recursive expression for factorial moment generating function	63
5.4	Zero--truncated generalized two-parameter Poisson-Lindley distribution	64
5.4.1	Probability generating function	65
5.4.2	Recursive expression for moment generating function	65
5.4.3	Recursive expression for factorial moment generating function	66
5.5	Index of dispersion and co-efficient of variation	67
5.6	Estimation of parameters	67
5.7	Goodness of fit	70
5.8	Conclusion	71

<b>6</b>	<b>Poisson-Sushila (PS) distribution</b>	<b>72-84</b>
6.1	Introduction	72
6.2	Proposed model	72
6.3	Properties of PS distribution	73
6.3.1	Shape of probability function	73
6.3.2	Probability generating function	74
6.3.3	Recurrence relation for factorial moment generating function	75
6.3.5	Moments of PS distribution	76
6.3.6	Index of dispersion and co-efficient of variation	76
6.3.7	Co-efficient of skewness and kurtosis	77
6.4	Zero-truncated Poisson-Sushila (ZTPS) distribution	77
6.4.1	Recurrence relation for probability generating function	78
6.4.2	Factorial moment generating function	79
6.5	Estimation of parameters	79
6.5.1	Method of moments	79
6.5.2	Method of maximum likelihood	81
6.6	Goodness of fit	81
6.7	Conclusion	84
<b>7</b>	<b>Some properties of Poisson size-biased new quasi Lindley distribution</b>	<b>85-95</b>
7.1	Introduction	85
7.2	Derivation of Poisson size-biased new quasi-Lindley distribution	86
7.3	Graphical representations	86
7.4	Distributional properties of PSBNQL distribution	89
7.4.1	Shape of the probability function	89
7.4.2	Factorial moments	89
7.4.3	Raw and central moments	90
7.4.4	Index of dispersion and co-efficient of variation	91
7.4.5	Probability generating function	92
7.4.6	Factorial moment generating function	92
7.5	Methods of estimation of parameters	93
	<b>Bibliography</b>	<b>96-105</b>