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# Knowledge, Perspective and Perception on Injection Phobia and the Need for Newer Technology Based Injections among General Population: An Observational study

Dr. Devi V N Akshay Varma Dwarabandam<sup>1</sup>, Dr. Sushma Reddy Mudhireddy<sup>2</sup>, Goje Vidyasagar<sup>3</sup>, Dr. C. Tirumala Ravali<sup>4</sup>, Dr. Naseemoon Shaik<sup>5</sup>, Dr Pudi Sri Harsha<sup>6</sup> <sup>1</sup>Bachelor of Dental Surgery, <sup>2,4, 5, 6</sup>Assistant Professor, <sup>3</sup>MDS, Public Health Dentistry

<sup>1, 2, 3</sup>Dr. NTR University of Health Sciences, Hyderabad, India

<sup>3</sup>MDS, Public Health Dentistry, Sri Sai college of Dental Surgery, Dr NTR UHS, Vikarabad India

<sup>4</sup>Department of Oral Medicine and Radiology, Govt. Dental College and Hospital, Afzalgunj, India

<sup>5</sup>Assistant Professor, Department of Pediatric Dentistry, MNR Dental College and Hospital, Sangareddy

Hyderabad, India

<sup>6</sup>Assistant Professor, Department of Prosthodontics and Crown& Bridge, MNR Dental College and Hospital, Sangareddy, Hyderabad, India

> \*Corresponding Author: Dr. Devi V N Akshav Varma Dwarabandam

Bachelor of Dental Surgery, Dr. NTR University of Health Sciences, Hyderabad, India

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### ABSTRACT

Background: Injection's phobia is estimated to be affecting at least 10% of the world population around the world contributing to one of the major causes for delaying or avoidance behavior of necessary medical attention due to which the chronic diseases progress to worsen the health status of the people.

Methods: This observational cross-sectional study was conducted by gathering answer responses from 392 participants recorded digitally on Google forms platform by pre sending a prepared questionnaire of existing awareness of the knowledge, perspective and perception on Injection phobia and need for newer gen technology of injections. Statistical data analysis was performed through the Chi square test using Microsoft Excel and SPSS.

**Results:** The results showed that the majority of the participants in the study population were female (64.3%). The mean  $\pm$  (SD) for the frequency of male and female gender study participants in different age groups were 35±26.73 for male and 63±81.98 for female respectively. No significant relationship was found between Age groups and prevalence of Injection fear as well as Gender groups, but quite strong significance was observed between Age and Need for Newer technology of Injections opinion and also acceptance of that newer painless technology.

Conclusions: This study results show that relatively high majority of the study participants were aware that they were affected by this Injections or needle phobia either directly or indirectly in remarkable ways and also showed satisfactory levels of basic knowledge lingo of the injections phobia and displayed quite a positive perspective on the acceptance of new technology of syringes and perceptions of the newer better features of the current traditional injection technologies. Therefore it is much necessary to increase the focus on working on the new and next generation injection technology initiatives to be funded properly by Government and public health agencies.

**Keywords**: Injection's phobia, Needle phobia, Injection technology, syringes, phobia

## **INTRODUCTION**

Aims: The principal aim of this study was to evaluate the awareness of Knowledge of needle or injections phobia and assess the perspective on the acceptance of newer technology and perception on the newer better features of the current traditional injection technologies-based procedures.

### **Background:**

Injections are one of the widely used current traditional habitual medical management protocols.

Trypanophobia is an extreme or irrational fear of injections which are used in medical procedures and

evidently passed on via inheritance or learned from past traumatic experiences of oneself or peers. Many with Trypanophobia avoid or delay getting medical attention that requires the use of needles, which can be quite threatening for those with chronic debilitation conditions (**Malcolm, 2020**) [1].

Needle phobia revealed to be as an anxiety related disorder with at least of 3.5% to 10% affected general population according to **Nir, Paz, Sabo, & Potasman, 2003**) [2] and reported with a median age of 5.5 years (**Bienvenu & Eaton, 1998**) [3].

The scientific research revealed quite an evidence that needle phobia decreases with age. To back it up, it was observed to be diagnosed in 19% of children (4–6 years), while the group of kids aged 10–11, it was reported to be 11% (Majstorovic & Veerkamp, 2003) [4].

Delaying or avoidance of medical attention wherever engaged with injections was 6.7% for dental treatment and 5.2% for medical treatment (Vika, Raadal, Skaret, & Kvale, 2006) [5].

Conclusively, the fear of injections was found to be more common than diagnosable needle phobia. Conditions indicate it to be decreasing with age.

There is by far no promising literature particularly manifesting and attending to factors significant for decreasing the fear of injections or needle phobia with age currently disclosed.

### **Etiology:**

Needle phobia is evidently implicated to having originated from an amalgamation of genetics and past life experiences (Willemsen, Chowdhury, & Briscall, 2002) [6].

Considerably, in conclusion, popularly observed opinion for the phobic fear is the consequence of a strong conditioning past traumatic events and recalling of those resulting in avoidance scenarios (Field, 2006) [7].

### Management:

According to previous research compositions, needle or injections phobia can be managed by focusing on the factor of anticipation of treatment outcomes being strainful when it comes to Needle or injection related concerns according to **Duff (2003) [8].**  In conclusion, Needle phobia nowadays is being managed by various techniques such as reassurance and education, avoidance of needles, postural and muscle tension techniques, benzodiazepines, nitrous oxide gas, and topical anesthesia applied by iontophoresis (Hamilton JG 1995) [9].

### **MATERIALS & METHODS:**

This observational cross-sectional study was conducted by gathering answer responses recorded digitally on Google forms platform by pre sending a prepared questionnaire regarding the Knowledge, perspective and perception on Injection phobia and need for newer gen technology of injections to tackle the phobia and sent via social media to quickly reach the random groups of general populations with no restrictions. All were informed beforehand regarding the study and total anonymity was assured with respect to confidentiality of their personal data. The total number of responses collected were from 392 individuals.

The study questionnaire consisted of four major parts namely demographic information-Age, Gender and Occupation and KPP (awareness of existing Knowledge, Perspective on acceptance of newer technology and Perception on new and better features of current traditional models) on injection phobia and need for newer technology. An additional file shows this in more detail (see Additional file

The number of questions related to demographics, knowledge, perspective, and perception are 3, 6, 3, 2, respectively. Descriptive statistics include the percentages and distribution of participants using tables and pie charts of data related to principal aims of this study and subjected to inferential statistical analysis that is Chi square test which was used to determines whether there is an association between categorical variables (Age, Gender with respect to Injection's phobia, Need for newer technology, Acceptance of newer technology. Less than 0.05 (P value) was considered to be significant.

### **RESULTS:**

A total of 392 individual participants took part in this observational cross sectional study, 64.4% of whom were female, 35.7% males from various occupational backgrounds **[Figure 2,3,4]** such as Healthcare(55.1%), Engineering(12.2), technology, Information technology(7%), Science

graduate(8.2%), workers responded quite attentively about knowledge part of the questionnaire and about current traditional injection delivery systems with compromising drawbacks over the years.

The Mean  $\pm$  SD of frequency of participants across different age groups [Figure 1] and gender [Figure 2] were  $35\pm26.73$  for male and  $63\pm81.98$  for female, respectively.

The majority of participants showed relatively satisfactory levels of awareness of knowledge on Injections phobia such basic understanding, equally recognizing their inherent fear of injections and proper positive acknowledgement of minor degree of delaying or avoidance of the medical treatments that require injections. Considering that 53.1% of them were aware of the term needle phobia or phrase of fear injections, in contrast to 22.4% responded with absolute "No", while a striking number of people said "not quite sure of the medical term" [Table 1].

Surprisingly, great number of people responded relatively in equal percentages(44.9% for Yes and 42.9% for No) of admitting that they have or ever have had fear of Injections with even some minor range of 8.2% said may be in contrast some relative low percentage(4.1%) to having said that may be or absolutely no idea even if they have or had it [Table 1].

Also, most participants showed a quite high positive perspective about the need of painless or needles injection design technologies(75.5%) [Figure 6] and subsequently great acceptance compliance of painless delivery injections if they were to take it [Figure 8] (74.5%) said they were willing to accept shots if the injections were made painless or needleless during the injection procedures [Table 2].

Much needed for during our current era, a vast majority of participants (45.9%) [Figure 7] believed that need for modification of current injections procedures would be in development of New technology of Injection syringes followed by good number(30.6%) choosing on operator's skill and experience to administer the shot which is much significant when compared to Needle size and diameter(11.2%), very few(1%) thought surrounding environment need to be modified for more acceptance levels of current traditional injections. [Table 2].

Quite remarkably yet, predictably, a vast number of individuals(56.1%) agreed on the thought that when injections if made painless and masked during the procedure could result in overcoming their fear of injections, in contrast to the opposing view of "No" (9.2) and for people who were on the edge of overcoming their fear said May be(30.6%) [Table 2].

Markedly impressive number of people(83.7%) were inclined to agree on the thought that Government and Public health agencies should invest much more on funding to develop new innovative technologies to improve the current traditional medical procedures **[Table 2].** 

### Discussion:

This is the first study to be conducted on Injection or needle phobia to evaluate the (KPP) knowledge perception and perspective on the awareness of it in the general population and evaluate the need for newer and better technology based injections to overcome the compromises of current traditional injection procedures.

Injection or needle phobia is highly underrated as a reported condition because of lack of much attention due to neglected psychological and hereditary aspects among children and younger adults. Some studies revealed it to be an anxiety disorder occurring in 3.5% to 10% of the general population (Nir, Paz, Sabo, & Potasman, 2003)[10] with a median age of onset of 5.5 years (Bienvenu & Eaton, 1998)[11].

In contrast to this study, we found that quite a high number of participants recognized(53.1%) the term injections phobia and admitted(44.9%) [Table 1]to having or ever had fear of injections in comparison to injections phobia seems to be dropped with older age at 20-30% in adults(McLenon J, Rogers MAM, 2019)[12]which is quite high in this study. Drawing up inference from this, the major extent of general populations has knowledge of the awareness now a days about their own conditions stemming from their previous experiences of trauma or might even be hereditary[**12**].

For obvious fear of injections, in this study a relative high number of participants(29.6%) **[Table 1]**were reluctant in accepting shots by delaying or avoiding the medical attention when compared to a study with avoidance of treatment at 6.7% and 5.2% for dental and medical treatments respectively(Vika, Raadal,

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Skaret, & Kvale, 2006)[13]. It could be deduced that the avoidance and delaying behavior runs deep into the untapped society of general populations.

A vast number of participants(88.8) got injections within 1-2 years(42.9%) **[Table 1]** in most of the clinical settings such as Doctors, Dental Clinics, Nurse and Diagnostic labs or Vaccination booths which helps in deducing that majority of them were getting shots by the officially recognized standard personnel providing a proof for better reach of medical services to these participant occupational distributions across the India.

With the literary proof of significantly high association of prevalence of injection phobia in females(McLenon, 2019)[12], striking numbers of participants(62.2%) were not aware of the fact in opposition to being aware of it(15.3%)[Table 1].

Perception and Perspective:

When the participants were evaluated on the perspective about the acceptance of new technology of syringes and perception on the newer better features of the current traditional injection technologies, it was revealed that extraordinarily significant number of participants(74.5%) were so much inclined to accept shots if the injections were administered painless or needless ways, in contrast to not willing group(5.1%) and also in great numbers(75.5%) felt the need for painless or needleless features in the next gen, when compared to opposed opinions of 7.1% participants for the need of painless technology of injections[**Table 2**].

Upon the assessment of perception of need for modification or improvement of current traditional technologies of injections, a remarkable count of participants opted for need for new technology of Injection syringes(45.9%) and relatively high number felt the need for improvement in Operator's skill and experience(30.6%), followed by Needle size and diameter(11.2%), lastly for modification in surrounding environment of clinical settings(1%) [**Table 2**].

These observational data **[Table 2]** so clearly suggests that the people were acknowledging the drawbacks of current traditional injection technology procedures and now on the edge to adapt to newer technology when correctly brought to the inception of better features either by improving the current injection syringes or by production of new innovative technologies in the next generation.

Interestingly, but quite notably, vast majority of participants(56.1%) agreed that their fear of injections could be overcome if at all, the syringes displayed no needles, specifically if masked before, during and after the procedure and made painless to the persons getting the shot, in contrast to a considerable number of them(30.6%) were on the verge of ''may be'' in comparison with totally opposing number(9.2%) of ''No'' [Table 2].

Note: This observational data **[Table 2]** could serve for a much affordable area of research avenues to explore low cost innovative features to work on and developmental opportunities for next generation painless injections technology.

While an exceptionally huge number of participants(83.7%) have expressed so positively demanding Government and public health agencies to fixate their focus on increasing the funding to work on the innovative projects to improve the Traditional Medical Procedures with better advancements and to develop newer technologies in variation to opposed opinion group of just 1% participants[**Table 2**].

The results of the present paper show no significant difference between the different Age groups and having fear of injections(Injection phobia) while in contrast, Orenius, Tage & LicPsych et al[14] and McLenon J et al[12] showed that injections and needle phobia decreases with age. This could be due to the fact that this study did not include children and adolescent populations in order to make the results more variably inferential for analysis.

In this study, no significant relationship was found between Gender and having fear of injections as opposed to McLenon J, Rogers MAM, 2019[12] review paper which stated that "Females were more affected by Injections phobia than males, across all countries studied. A probable reason for this difference in results could be due to the small sample size for a considerable analysis.

No significant positive relationship was found between age groups [**Table 3**], gender [**Table 4**] and Fear of injections [**Table 3,4**]

Novelty of this study yield has a peculiar and unexpected results showing a strong significant

relationship(0.007<0.05P)**[Table 5,** 6] between different age groups [Table 5], gender [Table 6] and perspective on improvement in current technology also quite a remarkably significant and association(0.007<0.05P) [Table 7,8] between the Age groups [Table 7], gender [Table 8] and acceptance of painless/ masked injections [Table 7,8] by choosing newer technology of syringes which demands us to overcome drawbacks in our current injection designs calling the need for the next generation innovative technology.

The limitations of this study are relatively small sample size when compared with other studies and does not assess the Children and adolescents like most of the research papers.

Conclusion:

This study observations has obtained and deduced data like never ever before with sufficient data to reveal that relatively high majority of the study participants of general populations were aware that they were affected by this Injections or needle phobia either directly or indirectly in thier own ways and also showed satisfactory levels of basic knowledge lingo of the injections phobia and displayed quite a significant positive perspective on the acceptance of new technology of syringes and even much advantageous perceptions on the newer better features of the current traditional injection technologies.

Therefore, it is quite imperative for government and public health agencies to conduct more of these studies in much more remote and rural areas to reach every nook and creek of this massively populated nations to get much deeper statistical analytic perspective on a large scale eventually rising the funding even more for new and innovative research initiatives to address this much persisting disorder i.e Injections phobia once and for all, granting each and every individual of world population freedom of peacefully accepting the required medical treatments without ever contemplating about a deeply rooted psychological or hereditary phenomena. However as observed in this study, to properly understand the differences in Age, Gender and Prevalence of Injections phobia as seen in this study, further much deep research evidence is needed to find the relationships of variable with Significance.

# Table 1: Questionnaire of awareness of existing knowledge on Injection phobia among study participants and percentages of their responses

Questionnaire	Options	Percentages of Study Participants N%
Have you ever heard or known	Yes	(208)53.1%
of the term Needle Phobia (Belonephobia) or Fear of Injustions (Trunsportable)?	No	(88)22.4%
injections (Trypanophobia)?	May be	(32)8.2%
	Not quite sure of the term	(64)16.3%
Do you or have had fear of	Yes	(176)44.9%

Injections (Trypanophobia)?	No	(168)42.9%
	May be	(32)8.2%
	Not quite sure	(16)4.1%
When was the last time you have got an Injection or a Vaccination	1-6 Months	(124)31.6%
shot?	1-2 Years	(168)42.9%
	2-5 Years	(56)14.3%
	Long time back	(44)11.2%
	Not even once	(0)0%
Have you ever got an injection shot at any of the following	Yes	(348)88.8%
settings: Doctors or Dentists Clinic, Diagnostic labs, or	No	(24)6.1%
v accination bootns?	May be	(20)5.1%
Have you intentionally avoided or delayed taking an Injection	Yes	(116)29.6%
owing to your Fear of Injections?	No	(252)64.3%
	May be	(24)6.1%
Are you aware that there is a significant relation between	Yes	(60)15.3%
being afraid of Injections and Female gender according to	Not aware of it	(244)62.2%
some? (1addio et al.,)	Not quite sure about it	(88)22.4%

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# Table 2: Questionnaire on Perspective on acceptance of newer technology and Perception on new and better features of current traditional injection procedures and percentages of responses

Questionnaire	Options	Percentages of Study Participants N%
Do you feel there is a need for Painless or Needleless Injections?	Yes	(296)75.5%
	No	(28)7.1%
	May be	(64)16.3%
	Not quite sure about both	(4)1%
Do you think if any of the injection procedures were made Painless or	Yes	(292)74.5%
Needleless, would you be much willing to accept shots/Injections?	No	(20)5.1%
	May be	(32)8.2%
	Not possible or never heard of those both features	(20)5.1%
	Not quite sure	(28)7.1%
What could be made better if you feel there is a need for modification or	Needle Size or Diameter	(44)11.2%
improvement in Injection procedures to make it more acceptable for People with Injections phobia?	Operator's Skill and Experience to administer the Shot	(120)30.6%
	Surrounding environment while giving the Shot such as Clinical Setting	(4)1%
	New Technology of Injection Syringes	(180)45.9%
	Not quite sure	(44)11.2%

 $\dot{P}_{age}186$ 

If at all, supposedly, the needles in the Injection procedures were made	Yes	(220)56.1%
painless and not visible to the Persons getting the shot, could their Fear of Injections be overcome in your	No	(36)9.2%
Opinion?	May be	(120)30.6%
	Not quite sure	(16)1%
Do you think that the Government and Public Health agencies should focus	Yes	(328)83.7%
more on increasing the funding to work on innovative technologies to improve Traditional Madiael	No	(4)1%
Procedures with advancements?	May be	(44)11.2%
	Not quite sure	(16)4.1%

Table 3: Age group distributions of the study participants N=392 for Fear of Injections questionnaire and Inferential statistical analysis was performed through Chi-square test

Observed values					Expected values				
	Fear of Injections			P value		Fear of Injections			
Age	No	Yes	Grand Total	0.102525413 Which is greater than	Age	No	Yes	Grand Total	
17-23	124	152	276	0.05,	17-23	129.55	146.44	276	
24-30	36	44	80	The data was	24-30	37.55	42.44	80	
31-40	16	8	24	the null hypothesis	31-40	11.26	12.73	24	
Above 40	8	4	12	stating that there is no relationship between	Above 40	5.63	6.36	12	
Grand Total	184	208	392	injections.	Grand Total	184	208	392	

Table 4: Gender distributions of the study participants N=392 for Fear of Injections questionnaire an	nd
Inferential statistical analysis was performed through Chi-square test	

Observed values				Expected values				
	Fear of Injections			P value		Fear of Injections		
Gender	No	Yes	Grand Total	0.629254396 Which is greater	Gender	No	Yes	Grand Total
Female	116	136	252	than 0.05,	Female	118.28	133.71	252
Male	68	72	140	The data was	Male	65.71	74.28	140
Grand Total	184	208	392	reject the null hypothesis stating that there is no relationship between Gender factor and fear of injections.	Grand Total	184	208	392

Table 5: different Age group distributions of the study participants N=392 for perspective on improvement in current technology by choosing newer technology of syringes and Inferential statistical analysis was performed through Chi-square test

Observed values					Expecte	ed values		
Age	Newer Technology of Syringes	Others	Grand Total	P value	Age	Newer Technology of Syringes	Others	Grand Total
17-23	112	164	276	0.007162924	17-23	126.73	149.26	276
24-30	44	36	80	Which is less than	24-30	36.73	43.26	80
31-40	16	8	24	0.05,	31-40	11.02	12.97	24
Above 40	8	4	12	The data was quite evidential to reject the null hypothesis	Above 40	5.51	6.48	12
Grand Total	180	212	392	and to accept alternate Hypothesis which states there is quite significant relationship between Age factor and choosing of	Grand Total	180	212	392

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Table 6: Gender distributions of the study participants N=392 for perspective on improvement in current technology by choosing newer technology of syringes and Inferential statistical analysis was performed through Chi-square test

Observed values				P value	Expected values			
New Tec Injection	hnolo Syrin	gy of ges		0.432065331 Which is greater than 0.05, The data was insubstantial to	New Technology of In Syringes			Injection
Gender	No	Yes	Grand Total	reject the null hypothesis stating that there is no	Gender	No	Yes	Grand Total
Female	140	112	252	between Gender factor and	Female	136.28	115.71	252
Male	72	68	140	choosing of Newer Technology	Male	75.71	64.28	140
Grand Total	212	180	392	of Syringes	Grand Total	212	180	392

Table 7: different Age group distributions of the study participants N=392 for perception on acceptance of Acceptance of painless/masked injections opinion and Inferential statistical analysis was performed through Chi-square test

Observed values				P value	Expected values			
Age	No	Yes	Grand Total	0.00743185 Which is less than 0.05,	Age	No	Yes	Grand Total
17-23	44	232	276	The data was quite	17-23	36.61	239.38	276
24-30		80	80	evidential to reject the	24-30	10.61	69.38	80
31-40	8	16	24	alternate Hypothesis that	31-40	3.18	20.81	24
Above 40		12	12	is there is quite significant relationship	Above 40	1.59	10.40	12
Grand Total	52	340	392	Acceptance of painless/masked injections opinion	Grand Total	52	340	392

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Table 8: Different Age group distributions of the study participants N=392 for perception of Acceptance of painless/masked injections opinion and Inferential statistical analysis was performed through Chi-square test

Observed values				P value	Expected values			
Gender	No	Yes	Grand Total	0.657084956 Which is greater than	Gender	No	Yes	Grand Total
Female	32	220	252	0.05,	Female	33.42	218.57	252
Male	20	120	140	The data was	Male	18.57	121.42	140
Grand Total	52	340	392	null hypothesis stating that there is no significant relationship between Gender factor and Acceptance of painless/masked injections opinion	Grand Total	52	340	392

### Figure 1: Age groups pie diagram distribution of Study participants in terms of Percentages



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Figure 2: Occupational distribution of Study participants represented as Pie charts



Figure 3: Occupational distribution of Study participants represented as Pie charts



### Figure 4 Occupational distribution of Study participants represented as Pie charts



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### Figure 5: Knowledge of existing awareness of Injections phobia

Do you feel there is a need for Painless or Needleless Injections?



### FIGURE 6 Perception on newer technology Syringe's opinion of Injections phobi

What could be made better if you feel there is a need for modification or improvement in Injection procedures to make it more acceptable for People with Injections phobia?



### Figure 7: Perspective about the Acceptance of Newer technology Injections

Do you think if any of the injection procedures were made Painless or Needleless, would you be much willing to accept shots/Injections?



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