

**PREVALENCE OF AND RISK FACTORS FOR SELF-REPORTED VOICE
PROBLEMS IN TIBETAN MONKS**

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SEPTEMBER-2023

CERTIFICATE

This is to certify that this dissertation entitled “**Prevalence of and Risk Factors for Self-reported Voice Problems in Tibetan monks**” is a bonafide work submitted in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student Registration Number: P01II21S0030. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for an award of any other diploma or degree.

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DECLARATION

This is to certify that this dissertation entitled “**Prevalence of and Risk Factors for Self-reported Voice Problems in Tibetan monks**” is the result of my own study under the guidance of Dr. M. Santosh, Professor in Speech Sciences, Department of Speech- Language Sciences, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier to any other University for award of any other diploma or degree.

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CHAPTER I

INTRODUCTION

Professional voice users (PVUs) are those who use their voice regularly for spoken communication in their line of work. There are various professions that can be grouped under the category of PVUs. This includes singers, teachers, actors, clergy, priests etc. The voice and spoken communication play a vital role in the work of all these PVUs. Voice problems (VPs) are more prevalent among PUVs compared to other normal populations since they are dependent on their voice to fulfill their livelihood. The correlation between voice problems and professions has gained significant attention as certain careers are more susceptible to the risks of developing VPs compared to others. Therefore, the prevalence of VPs has been investigated in various PVUs. According to the literature, teachers have prevalence rates between 11% and 81% (Devadas et al., 2017; Russell et al., 1998; Seifpanahi et al., 2016; Verdolini & Ramig, 2001), singers have 59% (Boominathan et al., 2008), Hindu temple priests have 43% (Devadas et al., 2019), and Imams reports 89% career prevalence of voice problems (Jayakumar et al., 2022).

Like other professionals, voice is a primary component for monks, and problems related to voice may lead to a negative impact on their life. Tibetans who live in the monastery along with others are called Tibetan Monks. They play a very significant role in maintaining the monastery. There are a total of six settlements for Tibetans in Karnataka, India out of them Lugsung Samdubling at Bylakuppe is a major one and was established earlier in 1960s. The Lugsom Samdupling Tibetan Settlement (LST) and the Tibetan Dickey Larsoe Settlement (TDL), both founded in 1969, are the two Tibetan settlements that are currently located in Bylakuppe.

According to the 2001 census, there are 4,056 people living in TDL and 10,496 people living in LST (Havaladar et al., 2014; Patnaik 2005).

Tibetan monks have different roles to be completed in their daily life. They must perform religious services in different rituals and ceremony related to Tibetan culture. Monks are considered as Lord Buddha's propagators, so they must chant, preach and teach related to the Buddhism community to the students in the monastery and even to the public. Monks also study about the Buddhist philosophy under which they must chant many prayers and mantras. The lifestyle of a monk is entirely different from a common man. Monks have a fixed routine to follow in their daily life. Daily routine of a monk includes waking up as early as 4.00am in morning, going for prayers which includes chanting for a few monks, and preaching for a few monks. This chanting and preaching will be hours together in day. Some monks also work in different departments in the monastery which includes administrative works.

Nature of the Prayer

There are two different kinds of prayers that are carried out by a monk. They are silent prayer and loud prayer. Silent prayer is done at their respective residential places and consists of chanting of mantras related to Buddhism without any musical instruments in a normal conversation level that is at around 40-50 dB SPL. Loud prayer consists of chanting mantras at a loud voice at their respective residential place or it can be in the monastery temple along with musical instruments. Different types of trumpets or wind instruments along with some percussion instruments are used during the loud prayer. The loudness of the musical instruments played during the prayer is more than 90 dB SPL. There are four sessions of loud prayer with musical instruments in a day, each session lasting for almost more than 2 hours at a stretch in the monastery temple.

Monks attending this session of loud prayer won't consume anything in between prayer. Hence in a day few monks will have loud prayer for about 8 hours. Some monks will engage themselves in loud prayer at their respective places.

The total duration of chanting varies from monk to monk, on an average in day minimum of 4-6 hours of chanting will be carried out. Monks will consciously alter their voice with respect to pitch and loudness during their chanting sessions. They are involved in a very low pitch chanting compared to their habitual pitch throughout their chanting sessions along with raising their intensity more than their habitual intensity. These changes may lead to vocal load which in turn might cause VPs. Few monks also pray in the presence of music instruments which will lead to a noisy environment. Praying while there is background noise is a significant risk factor for vocal disorders as well (Lindhe, 2007). Speakers appear to elevate their voices in noisy settings (noise of musical instruments) to compete with the noise which is known as the Lombard Effect. It is difficult to manage the Lombard Effect since it results from speaker's unconscious responses (Higgins & Smith, 2012). Due to this, there is a high chance of having strain their vocal folds and raise their vocal intensity and frequency.

Need for the study

To create awareness and educate the monks regarding their risk for developing voice problems, it is important to find the relation between the occupational voice, associated risk factors and voice problems. As per our knowledge monks do not undergo training for proper voice usage during the chanting sessions or knowledge about their vocal hygiene, phonotraumatic behaviors during training period. Currently very little is known about the risk factors and the VPs that can be developed by a monk. Further monks have less knowledge about chanting/praying related risk factors and

knowledge about improving their vocal health in different environment. Hence, there is great need to educate the monks about the professional voice, risk related to their chanting and praying.

Aim of the study

The study aimed to investigate Prevalence of and Risk Factors for Self-reported Voice Problems in Tibetan monks.

Objectives of the study

1. To investigate the prevalence of self-reported VPs in Tibetan monks
2. To identify the different variables associated with increased risk of VPs in Tibetan monks
3. To investigate the effect of VPs on Tibetan monks

CHAPTER II

REVIEW OF LITERATURE

Professional voice users are someone who rely on their voice as a primary tool for their profession. They often rely on their voice to communicate, entertain, inform, or educate others. Maintaining good vocal health is crucial for all the PVUs. A healthy voice is essential for these PUVs, as voice-related strain or injuries can negatively affect their careers. There are various occupations that can be considered as PVUs. Koufman and Isaacson (1991), presented a classification system that categorizes individuals based on their levels of vocal usage. The proposed classification is as follows:

Level I: Elite vocal performer

An elite vocal performer is someone for whom even a minor deviation in their voice could lead to severe and significant repercussions. Opera singers are considered the epitome of elite vocal performers, and it also includes other singers and actors.

Level II: The professional voice user

A person who may face challenges in performing their job adequately with a moderate vocal problem. This group includes teachers, lectures, clergy, and monks etc.

Level III: The non-vocal professionals

An individual whose severe vocal impairment hinders their ability to perform their job adequately. This level includes professionals like doctors and lawyers.

Level IV: The non-vocal non-professionals

An individual for whom vocal quality is not a necessary requirement for satisfactory job performance. This group includes laborers, clerks etc., While individuals in this group may face considerable social challenges due to voice disorders, their ability to engage in employment is not hindered.

Prevalence of voice problems in PVUs.

It is necessary to discuss the prevalence of voice problems in PVUs with respect to each profession because, each of the professions has their own characteristics in terms of the voice, with respect to vocal demands, and the environment at which they use etc.. Hence in literature there are various studies conducted with respect to each profession. A review of this literature reveals that most of the studies are done on teachers and singers.

Extensive research has been conducted on the increased susceptibility of teachers to develop voice problems, emphasizing their higher risk compared to other professions. According to the results of a systematic review and meta-analysis, teachers' voice disorders were found to be associated with several significant risk factors. These factors include gender, upper airway problems, caffeine consumption, speaking loudly, number of classes per week, and previous experiences of resigning due to voice problems (Byeon, 2019). The prevalence rate of VPs among teachers varies from 11% to 57% (Charn & Hwei Mok, 2012; Devadas et al., 2017; Higgins & Smith, 2012; Mattiske et al., 1998; Roy et al., 2004; Russell et al., 1998; Seifpanahi et al., 2016; Smith et al., 1998). The variability in statistical data found in published reports regarding voice problems among teachers can be attributed to differences in study populations, research methodologies employed, and varying definitions of voice problems and voice disorders. Singers are thought to be at a significant risk of developing vocal issues because singers engage in extensive rehearsals, sometimes compromising their voice rest, and are susceptible to elevated stress and anxiety levels due to the demanding nature of their profession.

A recent systematic review and meta-analysis on the prevalence of VPs among singers revealed that self-reported dysphonia was found to be present in approximately

46% of the cases (Byeon, 2019). A study on Carnatic singers reported point prevalence of 23% and career prevalence of 35% (Devadas et al., 2020). Among young choir singers, a study discovered that the incidence of VPs was approximately 23% (Ravall & Simberg, 2020).

A study was conducted on the Hindu temple priests and the findings of this study demonstrate a significant prevalence rate of 43% (career) and 19% (point). Most prevalent symptoms reported were dryness in mouth, vocal fatigue, momentary aphonia, shortness in breath, change in voice quality, and inability to speak in loud voice (Devadas et al., 2019). Another study on Slovenian Catholic priests revealed a carrier prevalence rate of 85.6%, and 15.9% experienced frequent VPs. The most frequent risk factors of VPs were respiratory tract infection followed by allergies, frequent clearing of throat, improper instruction on voice training and vocal hygiene (Hočevár-Boltežar, 2009). According to survey study on Tamil speaking imams, the career prevalence of VPs was 89% and point prevalence was 64% (Jayakumar et al., 2022).

Risk factors for developing VPs in PVUs

In general, possible risk factors for developing voice in a PVUs are phono traumatic behaviors, poor vocal environment, and vocal load. It is important to note that risk factors may vary from profession to profession. There are numerous studies in literature which have studied the relationship between the voice problem and risk factors.

“Any alteration in vocal function that arises from the professional use of one's voice and hampers, undermines, or obstructs the worker's performance and/or communication, regardless of whether there is any organic change in the larynx” is termed under work related voice disorder (Przysieszny & Przysieszny, 2015). They have

proposed factors for voice disorders which are responsible directly or indirectly. They are factors that are not related to occupation; this includes factors related to the individual like age, gender, vocal misuse/abuse, health conditions, smoking, alcohol. And factors that are related to occupation; this includes factors related to occupation like duration of voice usage, nature of work environment and work-related stress.

Phono traumatic behaviors

Phono traumatic behaviors refers to the improper or excessive use of the voice, which can lead to strain or damage of the voice and potentially lead to vocal problems or disorders. This includes behaviors like excessive yelling or screaming, frequent throat clearing and mimicry. According to a questionnaire survey on different professionals revealed politicians and vendors incorporated highest vocal abusive behaviors compared to others (Boominathan et al., 2008).

Vocal Load

Vocal load refers to the prolonged use of the voice, often to the point of vocal fatigue. It involves sustained and extensive vocal activity along with other factors (environment, noise levels and air). Vocal loading can lead to changes in voice in terms of loudness, frequency and the vibratory pattern of the vocal folds (Vilkman, 2004). Vocal loading can also be the result of an individual habit of speaking in loud voice or at a fast rate. Compared to males, females experience more vocal load due to their higher F0 and more vocal fold collisions (Baker, 2010; Vilkman, 2004).

Age

Literature reports older adults are more vulnerable to developing VPs, compared to younger adults (Higgins & Smith, 2012; Sataloff et al., 2005). Individuals in the age range of 40-59 years are at more risk for developing VPs (Roy et al., 2004). Studies have found a higher prevalence of VPs in teachers who are more than 50 years

of age (Higgins & Smith, 2012; Russell et al., 1998; Thibeault et al., 2004). Voice disorders in elderly people can be due to structural changes at the vocal folds and laryngeal structures (Higgins & Smith, 2012).

Environment

Environment refers to the surrounding in which the professional is working. A poor work environment can lead to VPs. It can be in terms acoustics, noise levels, air quality, dust, temperature and humidity. A dusty environment can cause respiratory problems and can affect the voice of the individual. Background noise is one of the major risk factors for developing voice problems (Lindhe, 2007). Speakers tend to increase their loudness, frequency and effort in the presence of the noise which in turn results in voice problems.

Stress and Health

Literature reports medical conditions can also be responsible for voice problems. Medications consumed for these conditions for longer duration can influence the voice of the individual. Frequently reported conditions contributing to VPs are respiratory problems, frequent cold, sinusitis, laryngitis and reflex disorder (Roy et al., 2004). GERD and hypothyroidism have been found to be one of the risk factors of developing VPs in teachers. Teachers with acid reflux were found to have voice disorders 4.8 times more frequently than those without (Devadas et al., 2017). Since emotions and mental state tend to affect the mobility of the vocal folds, stress and psychological strain are also linked to VPs.

Psychological issues can either contribute to or arise from disorders related to voice. These issues include stress, depression and anxiety (Alva et al., 2017).

Prevalence of VPs in monks

Review of literature revealed that only one study was conducted to study the voice of the monks by Chen (2018). This study was conducted on monks living in Thailand. This study was done to evaluate the prevalence, effects, and risk factors associated with voice disorder in Thai monks. The prevalence and consequences of VPs were investigated using a self-report questionnaire. The questionnaire consisted of questions that were factors responsible for VPs. The questionnaire was divided into 6 sections which are: (1) personal basic information, (2) daily life and health information, (3) behavior and demand on vocal use, (4) environment and vocal use, (5) individual's perception about vocal health condition, and (6) effects of voice disorders.

The outcomes of the study reported that among 453 monks almost 80% of the monks living in Prathum Thani Province, Thailand experienced voice disorder sometime in their life and 50% currently experience voice disorders. The most reported VPs included dry throat, pain in the throat, voice getting tired when speaking, having difficulty in speaking, voice cracking when speaking, voice becoming hoarse when speaking, loss of volume and being unable to raise their voice. Also, the study has not found a high level of negative effects from voice disorders. The different characteristics between monks with voice disorders and monks with no voice disorders were also compared. The significant differences found in this research include daily smoking, current health problems and medications, job-related stress, and voice use in an open area and loud voice use. Religious duties that involve heavy use of the voice, such as extended periods of chanting or prayer, could be associated with higher rates of voice disorder than those with lighter use of the voice, such as weekly preaching duties.

From the review of the literature, it can be concluded that PVUs are more susceptible of developing voice disorders compared to the general population. Among PVUs teachers are at higher risk for developing voice disorders. Like other

professional's monks can also be at risk for developing voice problems, and very little evidence have been reported. A study on Thai monks reports career prevalence of 80% and 50% of point prevalence. There are no studies pertaining to Tibetan monks. Such a study can provide insight on the prevalence, risk factors for voice disorders and helps in enhancing our knowledge on the voice problems of Tibetan monks.

Chapter III

METHOD

The study aimed to find the prevalence of voice problems (VP)s in Tibetan monks. The following were the objectives of the current study

1. To investigate the prevalence of self-reported VPs in Tibetan monks
2. To identify the different variables associated with increased risk of VPs in Tibetan monks
3. To document the effect of VPs on Tibetan monks

Participants

Participants for the present study were 300 Tibetan monks living in Namdroling Monastery Kushalnagar, Kodagu district of Karnataka, India.

Procedure

The study was conducted in three phases.

- I. Development and content validation of the self-reporting questionnaire
- II. Data collection using the developed questionnaire
- III. Statistical analysis

Phase I: Development and Content Validation of questionnaire.

To determine the prevalence and risk for VPs a self-reporting questionnaire in English language was developed. Review of literature regarding the questionnaire was carried out before the construction of the questionnaire. Previous questionnaires developed to investigate the prevalence of VPs in priests', teachers, and monks were used as the reference for the present questionnaire. Once the preliminary questionnaire was developed, the validation of the questionnaire was done by three speech language

pathologists who had at least five years of experience in handling voice disorders associated with PVUs. The questionnaire was then modified based on the input given by the SLPs. Next, the refined questionnaire was given to three Tibetan monks for the familiarity check, and they were asked to answer the following questions,

1. Whether the questionnaire included all information related to monks?
2. Did the questionnaire lack any information related to monks?
3. Were there any questions that were difficult to answer or not understandable?

After the familiarity check, the questionnaire was not modified by the investigator since there were no difficulty reported by the monks. The standardized questionnaire which was used in the data collection consisted of the following domains.

1. Demographic details: This section collects information regarding the name, age and education of the monk.
2. Occupation related: Questions related to their occupation such as since how many years they are monk, from when they are involved in chanting prayer, duration of prayer in a day, whether it is loud or soft prayer, presence of the musical instruments during the prayer, and whether they drink water in between the prayer, were asked in this section.
3. Lifestyle-related factors: This section contained questions regarding the daily lifestyle including food habits and other habits like chewing pan or betel leaves, drinking and smoking.
4. Health-related factors: This section taps on the general health of the monk with yes/no questions and if they are under medications for those health conditions.
5. Prevalence of VPs and awareness of vocal symptoms: Questions probing whether Tibetan monks had/have a VP, along with its nature, onset, when was VP first noticed are considered. Also, this section included yes/no questions on

different symptoms. Two questions to check the awareness regarding the voice problem were included.

6. The impact of VPs: Questions to check the impact of voice problem on their prayer (if they have missed praying because of voice problem), does it cause financial problems, does it affect their social life.
7. Voice care: this section gives insight on the knowledge of monks on voice care. Questions on whether they have consulted the concerned professional for their voice problem.

Phase II: Data Collection.

A cross-sectional survey was conducted after obtaining permission from the secretary of the Namdroling Nyingmapa Monastery. The investigator requested the secretary to arrange monks for the data collection. The aim and need of the study were explained in brief to all monks. The monks were asked, if they were willing to participate. The questionnaire was distributed to those who were willing to participate, and they were requested to fill out the questionnaire. For the reliability check, the questionnaire was distributed on 10% of the sample size.

Phase III: Statistical analysis

SPSS software was used for all the statistical analysis. The prevalence of VPs has been described using percentage. Pearson Chi square test was used to determine the difference between monks with VPs and monks without VPs with respect to various domains described in the questionnaire. Adjusted odd ratios with bivariate regression analysis was used to find the association between the presence of VPs and the different risk factors. Cohen's Kappa coefficient was used to find the test-retest reliability.

Chapter IV

RESULTS

The study aimed to investigate (a) the prevalence of self-reported voice problems (VPs) in Tibetan monks, (b) the different variables associated with increased risk of VPs in Tibetan monks, and the (c) the effect of VPs on Tibetan monks. To serve the purpose, a survey was conducted in Namdroling Monastery Kushalnagar, Kodagu district of Karnataka using a self-reported questionnaire. A total of 300 monks who were willing to participate were contacted and requested to fill the questionnaire.

Prevalence of VPs

The prevalence of VPs was computed by asking the monks to report whether they had faced any voice problems (VPs) since they started to be a monk. Out of 300 monks, 39.7% (n=119) of monks stated that they had VPs, which computes the career prevalence of VPs. Among them 11.8 % (n=14) reported they experience VPs once in a week, 47.1% (n=56) reported they experience VPs once in a month, 29.4% (n=35) reported they experience VPs once in 6 months, 11.8% (n=14) reported they experience VPs once in a year. Further 32.8% (n=39) first noticed their VPs in last one year, and 67.2 (n=80) noticed in greater than one year. Monks were also asked to describe the onset of the VPs, and 51.3% (n= 61) stated it was sudden in onset, 37% (n=44) stated it was gradual in onset and 11.8% (n= 14) reported it was intermittent in nature. Only 5% (n=6) of the monks who reported of VPs stated that their voice is getting worse day by day. Point prevalence of VP was computed by asking the monks if have any problem on the day of data collection. 10% (n=30) of the population reported positively. Out of which 46.7% (n=14) reported mild severity and 53.3% (n=16) reported moderate severity of the problem.

Based on the presence of VPs monks were divided into two groups, Monks with voice problem (VP) and monks without voice problem (WVP). Further two groups were compared across the different dependent variables using the chi square test.

Demographic and prayer related information

Demographic and prayer-related information of monks with and without VPs are shown in Table 1.

Table 1

Comparison of Demographic and Prayer-related Details Between Monks with VP and WVP

Characteristics		MVP	MWVP	χ^2	df	p
		(N=119 (N%))	(N=181 (N%))			
Age	5-20 y	13(11)	77(42)	34.213	2	<0.001*
	21-35 y	68(57)	68(38)			
	>35 y	38(32)	36(20)			
Education	1-12 th std	15(13)	71(39)	29.102	2	<0.001*
	Degree	104(87)	110(61)			
Number of years as a monk	0-10 y	15(13)	84(46)	45.817	4	<0.001*
	11-15 y	25(21)	37(20)			
	16-20 y	25(21)	19(11)			
	>20 y	54(45)	51(23)			
Chanting experience	0-10 y	15(13)	83(46)	46.903	4	<0.001*
	11-15 y	24(20)	39(21)			
	16-20 y	25(21)	18(10)			
	>20 y	55(46)	41(23)			
Trained for chanting	Yes	53(44)	111(61)	8.165	1	0.004*
	No	66(56)	70(39)			
	0-5 y	25(47)	58(52)	4.483	3	0.214

Number of years of training	6-10 y	19(36)	32(29)			
	11-15 y	3(6)	15(14)			
	16-20 y	6(11)	6(5)			
Number of hours involved in praying per day	1-3 h	11(9)	58(32)	96.936	3	<0.001*
	4-6 h	12(11)	80(44)			
	6-8 h	48(40)	29(16)			
	>8 h	48(40)	14(8)			
Involved in loud praying	Yes	112(94)	133(74)	20.423	1	<0.001*
	No	7(6)	48(26)			
Number of hours involved in loud praying per day	0-3 h	34(30)	105(79)	60.095	3	<0.001*
	4-6 h	51(45)	22(16)			
	6-8 h	27(24)	6(5)			
Number of hours involved in continuous loud prayer	0-3 h	108(96)	125(94)	6.951	2	0.031*
	4-6 h	4(4)	8(6)			
Involved in soft prayer	Yes	114(96)	166(92)	1.926	1	0.165
	No	5(4)	15(8)			
Number of hours involved in soft praying per day	1-3 h	47(41)	125(75)	34.208	3	<0.001*
	4-6 h	52(46)	31(19)			
	6-8 h	11(10)	9(5)			
	>8 h	4(3)	1(1)			
Number of hours involved in continuous soft prayer	0-3 h	66(58)	148(89)	43.215	3	<0.001*
	4-6 h	43(38)	13(8)			
	6-8 h	5(4)	5(3)			
Pray in the presence of musical instruments	Yes	87(73)	24(13)	110.32	1	<0.001*
	No	32(27)	157(87)	8		
	Soft to moderate	23(26.4)	21(97.5)	34.049	3	<0.001*

Loudness of musical instruments	Loud	40(46)	3(12)	107.10	1	<0.001*
	Very loud	24(28)	0			
Raise voice in presence of musical instruments	Yes	82(69)	20(11)	4	1	<0.001*
	No	37(31)	161(89)			
Loudness of background noise	Soft	4(5)	7(35)	20.290	2	<0.001*
	Moderate	36(44)	11(55)			
	Loud	42(51)	2(10)			
Number of hours praying in noisy environment	0-3 h	46(53)	21(91)	19.219	3	<0.001*
	>3 h	41(47)	2(9)			
Sip water in between praying	Yes	61(51)	142(78)	24.265	1	<0.001*
	No	58(49)	39(22)			
How often do you sip water	Once in 10-30 min	16(26)	97(68)	38.586	3	<0.001*
	Once in 1h	23(38)	34(24)			
	Once in 2h	22(36)	11(8)			
Additional job	Yes	10(8)	15(8)	0.001	1	0.972
	No	109(92)	166(92)			
Involves extensive voice usage	Yes	0	2(13)	1.449	1	0.229
	No	10(100)	13(87)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). y, years, h, hours, df, degree of freedom. MVP, monks with voice problem, MWVP, monks without voice problem

Voice problem was more prevalent in monks in the age range of 21-35 years (57%) and with the education of degree in Tibetan philosophy (87%). An increase in

number of monks having voice problem was noted as an when there is increase in number of years of being monk, number of years of chanting experience, and number of hours involved in praying per day. There was a significant difference between MVP and MWVP in terms of number of hours involved in loud prayer and soft prayer. Higher number of monks (95%) who are involved in 0-3 hours of continuous prayer with loud voice reported of having a VPs. 73% of MVP reported that they pray in the presence of musical instruments and 69% of them reported that they need to raise their voice in presence of musical instruments. 78% of MWVP reported that they sip water in between their prayer. Only 8% of MVP reported that they have additional jobs apart from being a monk but among them none of them reported extensive usage of voice in that job.

Phonotraumatic behaviors exhibited by Monks

Monks were asked to report about the different phonotraumatic behaviors that they were involved in, and the details are shown in Table 2.

Table 2

Comparison of phono traumatic behaviors Between Monks with and without WVP

Phono traumatic behaviors		MVP (N=119) (N%)	MWVP (N=181) (N%)	χ^2	df	p
Speak with a loud voice	Yes	91(76)	41(23)	84.397	1	<0.001*
	No	28(24)	140(77)			
Consciously altering voice	Yes	106(89)	54(30)	101.239	1	<0.001*
	No	13(11)	127(70)			
Speaking fast	Yes	47(39)	72(40)	0.002	1	0.961
	No	72(61)	109(60)			
	Yes	45(38)	21(12)	28.749	1	<0.001*

Excessive speaking	No	74(62)	160(88)			
Frequent throat clearing	Yes	91(76)	78(43)	32.514	1	<0.001*
	No	28(24)	103(57)			
Frequent coughing	Yes	43(36)	12(7)	41.744	1	<0.001*
	No	76(64)	169(93)			
Chant/speak during throat infections	Yes	114(96)	69(38)	100.395	1	<0.001*
	No	5(4)	112(62)			
Chant/speak during voice problem	Yes	103(87)	25(14)	155.305	1	<0.001*
	No	16(13)	156(86)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom. MVP, monks with voice problem. MWVP, monks without voice problem

On comparing MVP and MWVP, with respect to the vocal behaviors there were significantly higher number of monks in MVP group who were involved in speaking in loud voice, frequent throat clearing and altering their voice during the chanting or normal conversation. Further a significantly higher number of MVP reported that they were involved in chanting/ speaking during the throat infection and voice problem.

Vocal symptoms experienced by Monks

The different vocal symptoms experienced by monks with and without VP are shown in Table 3. Monks were asked to indicate the vocal symptoms that they have experienced. Among the 11 symptoms, hoarseness (79.8%) was the most frequently reported, followed by momentary loss/sudden changes in voice (73.1%), dryness in the throat (64.7%), and loss of voice (52.1). Except vocal symptom reduced breath support, all the other symptoms were significantly higher in monks with VP.

Table 3*Comparison of Different Vocal Symptoms Between Monks with VP and WVP*

Symptoms		MVP	MWVP	χ^2	df	p
		(N=119)	(N=181)			
		(N%)	(N%)			
Hoarseness	Yes	95(80)	3(2)	199.48	1	<0.001*
	No	24(20)	178(98)			
Dryness in the throat	Yes	77(65)	37(20)	59.707	1	<0.001*
	No	42(35)	144(80)			
Voice fatigue	Yes	35(29)	5(3)	44.125	1	<0.001*
	No	84(71)	176(97)			
Tightness in the throat	Yes	18(15)	3(2)	20.006	1	<0.001*
	No	101(85)	178(98)			
Momentary loss of voice	Yes	87(73)	3(2)	174.54	1	<0.001*
	No	32(27)	178(98)			
Discomfort in the throat	Yes	45(38)	6(3)	60.565	1	<0.001*
	No	74(63)	175(97)			
Pain in the throat	Yes	20(17)	9(5)	11.515	1	0.001*
	No	99(83)	172(95)			
Reduced breath support	Yes	6(5)	4(2)	1.787	1	0.181
	No	113(95)	117(98)			
Loss of voice	Yes	62(52)	1(1)	114.99	1	<0.001*
	No	57(48)	180(99)			
Trouble with speaking loudly	Yes	19(16)	2(1)	24.358	1	<0.001*
	No	100(84)	179(99)			
Frequent coughing	Yes	28(23)	16(9)	12.379	1	<0.001*
	No	91(77)	165(91)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to

compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom MVP, monks with voice problem, MWVP, monks without voice problem

Awareness of voice disorder

A comparison of awareness of the VP and attitude towards VP between MVP and MWVP is shown in Table 4. From the table, it is evidence that there is significant number of monks who had consulted specialists for VPs. Most of the monks in both groups reported that they are interested in receiving instructions for their voice care. Significant difference was not found between both the groups when they were asked about the risk factors associated with voice problems. Majority (67%) of monks in without VPs group agreed that adequate voice rest is required. About 37% of monks with VPs reported that they had consulted specialist for their VP. Majority of the monks in both the groups reported that they were interested in receiving instructions for voice care.

Table 4

Awareness About Voice Disorder Among Monks (MVP and MWVP)

Factors		MVP (N=119) (N%)	MWVP (N=181) (N%)	χ^2	df	p
What are the risk factors for VPs	Loud chanting/talking	18(15)	45(25)	11.616	3	0.009*
	Continuous talking/chanting	45(38)	84(46)			
	Background noise/smoke	1(1)	2(1)			
	All the above	55(46)	50(28)			
Requiremen t of	Yes	65(55)	122(67)	4.996	1	0.025*
	No	54(45)	59(33)			

adequate voice rest						
Consulted specialist for VPs	Yes	44(37)	4(2)	64.563	1	<0.001
	No	75(90)	177(98)			*
Interested in receiving instructions for voice care	Yes	115(97)	166(92)	2.937	1	0.087
	No	4(3)	15(8)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom. MVP, monks with voice problem, MWVP, monks without voice problem

Lifestyle

The monks were informed to provide details about their lifestyle including amount of intake of water, coffee, tea, carbonated juices and non-carbonated juices. Also, they were asked about fasting and diet style. The details of the lifestyle of monks are shown in Table 5. As shown in the Table 5, there were no significant differences between monks with VP and monks without VP regarding their lifestyle except for the intake of water, extreme oily/ spicy food and extreme hot/cold food items. 32% of the monks who had reported VPs were drinking less than 2 liters of water per day and 56% were drinking less than 3 liters of water. None of the monks reported about the odd timing of food intake. Majority of monks (65%) sometimes had intake extreme of oily/spicy food items and 60 % of monks with VPs rarely had extreme intake of extreme hot/cold. Since smoking and drinking are not culturally acceptable in the monastery, monks do not report the habit of smoking or drinking.

Table 5

Comparison of Lifestyle Between MVP and MWVP

Lifestyle factors		MVP (N=119) (N%)	MWVP (N=181) (N%)	χ^2	df	p
Fasting	Yes	3(2)	8(4)	0.733	1	0.392
	No	116(98)	173(96)			
Intake of extreme oily/spicy items	never	1(1)	8(4)	15.540	3	0.001*
	rarely	12(10)	32(18)			
	sometime	77(65)	123(68)			
	mostly	29(24)	18(10)			
Intake of extreme cold/hot items	never	3(2)	17(9)	7.730	3	0.052
	rarely	71(60)	109(60)			
	sometime	43(36)	49(27)			
	mostly	2(2)	6(3)			
Water intake	1 to 1.9 liters	38(32)	31(17)	19.552	2	<0.001 *
	2 to 2.9 liters	67(56)	92(51)			
	> 3 liters	14(12)	58(32)			
Tea	0-1 cup	68(57)	91(50)	1.359	1	0.244
	>1cup	51(43)	90(50)			
Coffee	<1 cup	51(43)	96(53)	2.978	1	0.084
	>/= 1 cup	68(57)	85(47)			
Carbonate d juice	<100 ml	62(52)	99(55)	0.194	1	0.659
	>/= 100 ml	57(48)	82(45)			
Non- carbonated juice	<100 ml	90(76)	143(79)	0.472	1	0.492
	>/= 100 ml	29(24)	38(21)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom. MVP, monks with voice problem, MWVP, monks without voice problem

Health-related conditions

In this section monks were asked about any of the health conditions that they are suffering from and about intake of medications for that for illness.

Table 6

Health-related Conditions Among Monks (MVP & MWVP)

Health-related Conditions		MVP	MWVP	χ^2	df	p
		(N=119)	(N=181)			
		(N%)	(N%)			
Asthma	Yes	9(8)	10(5)	0.503	1	0.478
	No	110(92)	171(95)			
Sinus problems	Yes	4(3)	7(4)	0.052	1	0.820
	No	115(97)	174(96)			
Nasal allergies	Yes	5(4)	7(4)	0.021	1	0.885
	No	114(96)	174(96)			
Frequent cold and cough	Yes	17(14)	17(9)	1.711	1	0.191
	No	102(86)	164(91)			
Dry mouth or throat	Yes	38(32)	20(11)	20.007	1	<0.001*
	No	81(68)	161(89)			
Difficulty in hearing	Yes	5(4)	4(2)	0.979	1	0.323
	No	114(96)	177(98)			
Acid reflux	Yes	47(39)	29(16)	20.915	1	<0.001*
	No	72(61)	152(84)			
Stress	Yes	3(2)	0(0)	4.609	1	0.032
	No	116(98)	181(100)			
Regular medications	Yes	8(7)	9(5)	0.411	1	0.521
	No	111(93)	172(95)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom. MVP, monks with voice problem, MWVP, monks without voice problem

In the VP group, a significantly higher number of monks ($p<0.05$) reported that they have dry mouth and acid reflux issues. Only a negligible number of monks reported other medical conditions.

Risk factors associated with the presence of VPs

Risk factors which are significantly associated with presence of voice problems were calculated using odds ratio with 95% confidence interval with binary logistic regression. Options which depicted Normal behavior or behavior without any risk were considered as reference. Binary logistic regression was used because most of the options were binary in choice. The results of the odds ration are depicted in Table 7.

Table 7

Factors that are Significantly Associated with Presence of Voice Problem.

Factors		Adjusted Odds Ratio* (95% CI)	p
Number of hours involved in praying per day	1-3 h	1.00	Referent
	4-6 h	1.394(0.481 - 4.038)	0.541
	6-8h	6.190(2.136 -17.943)	0.001*
	> 8 h	8.147(2.652 - 25.028)	<0.001*
Pray in the presence of musical instruments	Yes	17.064(7.642 - 38.101)	<0.001*
	No	1.00(reference)	Referent
Sip water in between praying	Yes	1.00(reference)	Referent
	No	3.769 (1.669 - 8.512)	<0.001*
Speak with loud voice	Yes	2.728(1214 – 6.132)	0.015*
	No	1.00	
Consciously altering voice	Yes	4.108 (1.584 – 10.655)	0.004*
	No	1.00	Referent
Frequent coughing	Yes	2.819 (1.139 -6.979)	0.025*
	No	1.00	Referent

Chant/speak during throat infections	Yes	5.644(1.791 - 17.186)	0.003*
	No	1.00	Referent
Chant/speak during voice problem	Yes	8.036 (3.419 - 18.891)	<0.001*
	No	1.00	Referent
Dry mouth/ throat	Yes	3.907(2.091 - 7.298)	<0.001*
	No	1.00	Referent
Acid reflux	Yes	3.526(2.014 - 6.174)	<0.001*
	No	1.00	Referent
Water intake	1 to 1.9 liters	5.928 (2.419 - 14.528)	<0.001*
	2 to 2.9 liters	2.398 (1.173 - 4.902)	0.017*
	> 3 liters	1.00	Referent

* Values denotes statistical significance (p< 0.05).

The results of odds ratio shows that the risk of developing VPs in monks is 6.1 times more for 6-8 hours and 8.1 times more in > 8 hours of prayer duration in a day. Overall results showed that the duration of the prayer had a significant association with the presence of VPs. Praying in the presence of musical instruments was also found to be a significant risk factor. Monks who pray in the presence of musical instruments are 17 times higher risk than monks who did not report this. Also, monks who did not sip water in between the prayers are having 3.7 times higher risk of developing VPs than those who were sipping water during the prayer. Odds ratio showed that speaking with a loud voice, consciously altering voice, frequent coughing, chanting/speaking during throat infections, chanting/speaking during VPs are at a higher risk of developing VPs. Monks reporting speaking in loud voice 2.7 times higher risk, monks who reported they consciously alter voice were at 4.1 times higher risk, monks who are involved in frequent coughing were at 2.8 times higher risk, monks who chant/speak during throat infections were at 5.6 times higher risk, monks who chant/speak during the presence of

VPs were at 8 times higher risk than monks who did not report these behaviors. Two medical conditions were also found to have significant association with the presence of VPs. As depicted in Table. 7 Monks reporting dry mouth/throat and acid reflux were at 3.9 times and 3.5 times higher risk of developing VPs than monks who did not report those medical conditions.

Impact of voice problem

Table 8

Impact of Voice Problem on Daily Living of Monks (MVP & MWVP)

Effects		MVP (N=119) (N%)	MWVP (N=181) (N%)	χ^2	df	P value
Feeling about voice problem	It does not affect me	31(26)	177(98)	174.120	2	<0.001*
	Rarely frustrates me	59(50)	4(2)			
	Sometimes frustrates me	29(24)	0			
Number of days missed	None	75(63)	181(100)	78.427	2	<0.001*
	2-3 days	36(30)	0			
Praying about a week		8(7)	0			
Cause financial burden	Yes	5(4)	0	7.734	1	0.005*
	No	114(96)	181(100)			
Interact less with family/friends due to VP	Yes	69(58)	3(2)	124.880	1	<0.001*
	No	50(42)	178(98)			
Avoid social gathering	Yes	60(50)	1(1)	110.219	1	<0.001*
	No	59(50)	180(99)			

Difficulty using telephone	Yes	6(5)	2(1)	4.288	1	0.038*
	No	113(95)	179(99)			
Repeat yourself during conversation	Yes	30(25)	4(2)	37.796	1	<0.001*
	No	89(74)	177(98)			

Note: Data are number (percentage) of monks with voice problems and without voice problems. Based on the number of respondents in each group percentages were calculated. Chi square test was used to compute the P values. * Values denotes statistical significance ($p < 0.05$). df, degree of freedom MVP, monks with voice problem, MWVP, monks without voice problem

The effect of VPs on monks are depicted in Table 8. Under this section monks were asked to indicate the impact of voice problem in their daily living. Among the monks with voice problem majority of them (63%) reported that they have not missed praying due to VPs. However, 30% of the monks with VPs reported that they had missed praying for about 2-3 days and 7% reported that they had missed praying for about a week. Also, monks have reported that they interact less with family and friends (53%) and avoiding social gathering (50%) due to VPs. Majority of the monks with VP (96%) did not face any financial burden and 95% of monks with VP did not report difficulty in using telephone. About the feeling regarding VP 26% of monks with VP reported that it won't affect them, 50% stated that it rarely frustrates them and 24% reported that it sometimes frustrates them.

Reliability

The questionnaire was administered again to 10% of randomly selected participants to assess the test-retest reliability. Cohen's Kappa coefficient was used to find reliability. Results revealed that r value ranged from 0.7 to 1.00, indicating that good to excellent agreement.

CHAPTER V

DISCUSSION

The primary aim of the study was to find the prevalence of self-reported VPs in Tibetan monks. For this purpose, a questionnaire was developed, and monks were asked to fill the questionnaire. The presence of VPs was decided based on the answer to the question “Have you had any voice-related problems since you started this profession that has prevented you from chanting prayers or which interfered with your profession?”. Results of the study indicated that 39.7% monks reported having VPs in their career. The findings of the study can be attributed to increased vocal load from prolonged chanting/praying. Further monks are involved in praying in the presence of the musical instruments which in turn may cause them to increase their habitual loudness. Apart from this, monks are involved in phonotraumatic behaviors like speaking in loud voices, altering their voice with respect to pitch and loudness and speaking/chanting during throat infections. All of these may be possible reasons for the development of VPs. However, prevalence rates estimated are lesser than that of other PVUs. Hindu temple priests had 43% prevalence rate (Devadas et al., 2019), Catholic priests had 85.6% prevalence rate (Hočevár-Boltežar, 2009), Imams had 89% prevalence rate (Jayakumar et al., 2022), and Thai monks had 80% prevalence rate (Chen, 2018). The difference in the prevalence may be attributed to the difference in definition of VPs, sample size, number of years of training, amount of vocal load and awareness of voice and its problems. However, Carnatic singers had similar prevalence rates of 35% (Devadas et al., 2020).

Findings of the present study will be discussed based on the comparison between responses of Monks with voice problems (MVP) and Monks without voice

problems (MWVP). The responses of monks were compared across various characteristics like demographic and prayer related information, vocal behaviors, vocal symptoms, awareness of VPs, impact of VPs, lifestyle and health conditions.

Demographic and prayer related information

There was a significant effect of age between monks with VP and monks without VP. The present results do not correlate with the study done on Thai monks. Chen (2018) reported that age does not influence the presence of VPs. However, similar findings have been reported in literature for other PVUs (Devadas et al., 2019, 2020; Roy et al., 2004). Number of years of being a monk and number of years of chanting experience was found to have a significant association with the presence of VPs. Higher number of monks with VPs had more than 20 years of experience. These results are consistent with the findings of other studies on PVUs (Devadas et al., 2017; Higgins & Smith, 2012). But Chen (2018) found that the number of years of experience did have a significant influence on having VPs which could be because monks participating in that study had a maximum experience of 8 to 9 years after which they are not serving as a monk. A significant difference was observed between monks reporting VPs and duration of prayer per day. Majority of monks with VPs were involved in a minimum of 6 hours of prayer in a day. These results contradict the results reported in the literature (Chen, 2018; Devadas et al., 2019, 2020). This discrepancy in the results may be due to differences in the duration of the prayer. Monks in the current study are involved in praying for longer duration whereas other PVUs are involved in shorter duration. Devadas et al., (2019), reported that teaching in the presence of background noise had a significant association with the presence of VPs which was attributed to the increase in the vocal loudness. Similar results were found in the present study as most of the monks having VPs were involved in praying in the accompaniment of musical

instruments, among them 69% monks reported that they need to raise their vocal loudness.

However, background noise was not found to have a significant association with the presence of VPs in Hindu temple priests (Devadas et al., 2019), in Carnatic singers (Devadas et al., 2020) and in Thai monks (Chen, 2018). The reason that the authors state is that overall noise level is perceived to be low which does not require increase in the vocal loudness. Monks with VPs in the present study were more likely to be involved in the phonotraumatic behaviors like speaking with loud voice, consciously altering their voice, frequent throat clearing, excessive speaking, speaking/chanting during voice problem and throat infections than Monks without VPs. All these factors may negatively influence the voice and may be the probable risk factors for the development of the VPs. There was no significant difference found between the two groups of Monks (VP and WVP) was observed with involvement in soft prayer and having additional jobs suggesting that these factors have less influence on developing VPs.

Symptoms

Among the 11 symptoms, hoarseness (79.8%) was the most frequently reported, followed by momentary loss/sudden changes in voice (73.1%), dryness in the throat (64.7%), and loss of voice (52.1%), discomfort in throat (38%). All the symptoms were found to have significant differences between both the groups of monks (VP and WVP). These findings suggest that monks with VPs have varied voice symptoms. Similar findings were found in Hindu temple priests (Devadas et al., 2019). Chen (2018) reported that dryness in the throat was the most frequently occurring symptom along with other symptoms like pain in the throat, voice cracking, vocal fatigue and difficulty

in speaking in Thai Monks. The symptoms which were most frequently reported by Imams were roughness, vocal fatigue, fluctuations in pitch and loudness, breathing difficulty and aphonia for short duration (Jayakumar et al., 2022). For Carnatic singers' vocal fatigue was the most frequently reported symptom and can be attributed to the phono traumatic behaviors exhibited (Devadas et al., 2020). These symptoms are signs of misuse or overuse of the voice.

Consulting Professionals

A significant difference was found between both the group of monks (VP and WVP), in consulting the professionals. However only 10% of monks with VPs had consulted specialists. Among those who consulted specialist's majority had sought help from the ENT doctor. 14.3 % of teachers reporting VPs had consulted physician or Speech language pathologist (Roy et al., 2004). Current results highlight that monks may not be aware of association with their profession and VPs, may be giving less importance to the symptoms unless it is very severe, and they may not be aware of the professionals to be contacted. Also, 97% monks reporting VPs were interested in receiving instructions for their voice care. These results suggest that they are not aware of the professionals to be contacted for their problems. About 63% of Monks with VPs reported that they have not missed praying because of VPs. Since monks are involved in praying/chanting for longer duration as part of their religious duties, they are not aware of the fact that it may cause VPs and hence they continue praying even with VPs.

Risk factors

Praying in the monastery is associated with many risk factors which have a negative influence on voice. The results of the present study depict that VPs were significantly higher in monks who pray for longer duration, pray in presence of musical

instruments, do not sip water in between prayers, are involved in few phonotraumatic behaviors, and have medical conditions (acidity and dry mouth).

Prayer-related factors

The results of the present study showed that duration of the prayer had a significant association with the presence of VPs. Monks who are involved in more than 8 hours had 8.1 times more risk of developing VPs than those who pray for less than 8 hours. However, duration was not reported to be significant risk factors for Thai monks (Chen, 2018). Further contradictory results were also found in other PVUs (Devadas et al., 2020; Jayakumar et al., 2022; Roy et al., 2004; Santosh et al., 2012). The discrepancies in the results may be attributed to the difference in duration of voice usage between the PVUs. In the present study most of the monks are involved in praying for a minimum of 6 hours whereas other PVUs are involved in a maximum of three hours voice usage per day. Monks who prayed in the presence of musical instruments had 17 times higher risk of developing VPs compared to those who did not pray in the presence of musical instruments. The environment can be noisy due to the presence of musical instruments. also reported similar findings in primary school teachers. Praying or speaking in the presence of background noise increases the vocal load (Vilkman, 2004), since speakers tend to increase their habitual loudness. Further increase in the loudness may lead to vocal fatigue as there are changes in the structural changes in vocal folds (Jónsdóttir, 2003). Also, 3.7 times higher risk was found in monks who did not sip water in between prayer which can lead to dehydration of the vocal folds. Studies report that dehydration of VFs increases the stiffness and viscosity of the vocal folds leading to increased effort to speak (Boone, 1991; Chan & Tayama, 2002).

Phonotraumatic behaviors

Monks who are involved in speaking/chanting during throat infections were found to have 5.6 times more risk of developing voice problems. Similar results were also reported in Hindu temple priests (Devadas et al., 2019) and in Imams (Jayakumar et al., 2022). Changes in the vocal fold tissues are associated with the excessive usage of voice during throat infections (Boone et al., 2005). Consciously altering the voice with respect to pitch or loudness was found to be a significant risk factor (4.1 times higher) in monks with VPs. These results were also found to be true in Hindu temple priests (Devadas et al., 2019) and may lead to vocal abuse or hyper functional production of voice. Clearing throat often was reported to be a significant risk factor (4.11 times higher) in Priests reporting the presence of VPs (Devadas et al., 2016). Similar results were found to be true in the present study. Monks who are involved in frequent throat clearing had 2.8 times of higher risk of developing VPs. Literature also reports excessive throat clearing as frequent phonotraumatic behavior in professionals with VPs because it leads to aperiodic vocal folds closing (Stemple et al., 2018).

Medical conditions

The results of the present study suggest that acid reflux is a significant factor (3.5 times higher) in monks experiencing VPs. These results were also true in the case of primary school teachers (Devadas et al., 2017). Teachers who were having acid reflux had 4.8 times higher risk of developing VPs compared to those who did not have acid reflux. Literature reports acid reflux as one of the most prominent risk factors for the development of VPs (Koufman et al., 1996; R. T. Sataloff, 2008).

Acid reflux may lead to laryngitis and tightness in laryngeal muscles (Gill & Morrison, 1998). Hence the presence of acid reflux can be a significant risk factor for developing VPs. Further, Monks who reported having dry mouth or throat of 3.9 times

higher risk of experiencing VPs. It is known that dry mouth or throat may be the result of dehydration, which is also considered as a major factor for VPs because it leads to changes in the viscoelasticity of vocal fold mucosa (Titze & Martin, 1998). Stress was reported to be a significant risk factor in Carnatic singers (Devadas et al., 2020), primary school teachers (Devadas et al., 2017), Imams (Jayakumar et al., 2022). and in Hindu temple priests (Devadas et al., 2019). However, this result was not consistent in the present study. Only three monks with VPs reported to have stress related to their job. Monks living in monastery involve themselves in religious services, practice meditations and they do consider praying as rituals which could decrease the chances of having stress related problems.

Lifestyle-related factors

A significant difference was observed between Monks with VPs and Monks without VPs with respect to their diet. Among Monks with VPs, 65% reported that they sometimes had intake of extremely oily/spicy food and 60% rarely had intake of extremely hot/cold food items. However, present results are contradicting results reported in literature in various other PVUs (Devadas et al., 2019, 2020). Further, 32% of the monks who had reported VPs were drinking less than 2 liters of water per day and 56% were drinking less than 3 liters of water. There was a significant difference between both groups of monks (VP and WVP) with respect to water intake. But this result was not observed in case of Carnatic singers (Devadas et al., 2020), Hindu temple priests (Devadas et al., 2019) and in primary school teachers (Devadas et al., 2017). This discrepancies in the results may be because of the differences the options given in the current questionnaire and compared to monks other PVUs give more importance to their voice hence, they try to keep their voice healthy. There was no significant difference between either the groups (VP and WVP) in terms of intake of different

beverages and fasting. Also, none of the monks both in VP and WVP group reported having the habit of smoking, drinking and chewing pan or betel leaves as is prohibited in the monastery and culturally not accepted.

Effect of VPs

Among the monks with VPs majority of them (63%) reported that they have not missed praying due to VPs. However, 30% of the monks with VPs reported that they had missed praying for about 2-3 days and 7% reported that they had missed praying for about a week. For monks praying is part of their activity of daily living and they consider it as their duty. Hence, majority of monks do not take off from praying unless the symptom is so severe which is preventing them from performing the prayers. According to Devadas et al. (2019) 32% of Hindu temple priests with VPs reported to have missed working and a lesser percentage is attributed to the financial burden caused by missing work. Among Carnatic singers having VPs, 27% reported missing their performances because they consider missing or cancelling the performances as inability to fulfill their professional responsibilities hence, they continue to perform in presence of VPs (Devadas et al., 2020). Further, more than 50% of the Monks with VPs reported that they avoid social gathering and interact less to family or friends due to VPs. These findings lead to the assumption that monks are highly concerned about projecting themselves in front of others, so even the slightest difference in their speaking voice can have a huge impact on them. The present results contradict the results found in Carnatic singers as they reported less impact on social communication, because singers pay less attention to their speaking voice (Devadas et al., 2020). Also, only 4% of monks with VPs reported to have financial burden due to the presence of VPs, because the income of the monks is not solely depended on their prayer that they perform. Further monks with VPs are asked to report their feeling about the presence of VPs, about 50%

of monks with VPs reported that they are rarely frustrated by VPs and 24 % reported that they are frustrated sometimes. But 26% of monks with VPs reported that VPs do not affect them. From the above findings it can be assumed that monks do not consider VPs to be a problem and it also does not affect their psychological wellbeing.

SUMMARY

The findings of the present study revealed that 39% of Tibetan monks experience voice problems in their career. Vocal symptoms were reported by both the group of monks (VP and WVP); however, it was significantly more in monks with VPs. Among 11 symptoms in the questionnaire, hoarseness, momentary voice loss/sudden changes in voice, dryness and loss were the most frequently reported symptoms. Monks reporting the presence of VPs also exhibited different phonotraumatic behaviors like speaking with loud voice, constantly altering the voice, frequent throat clearing, speaking/chanting during throat infections or voice problems higher than those who did not report VPs which are identified as the possible risk factors for the development of VPs.

The results also suggest that VPs in monks also affect them in terms of missing praying, interacting less with family/friends and avoiding social gathering. But poor treatment seeking behavior was exhibited in monks with VPs. The results of bivariate regression analysis identified few significant risk factors (> 8 hours prayer duration per day, praying in the presence of musical instruments, not sipping water in between prayer, few phonotraumatic behaviors, less than 3 liters water intake, presence of acid reflux and dry throat) responsible for VPs, suggesting that factors responsible in Tibetan monks are multifactorial in nature.

CONCLUSION

From the results of the present study, it can be concluded that monks are at a high risk of developing VPs and several factors (vocational & environment, lifestyle and health) contribute to the development of VPs. Most of these factors can be controlled and good vocal care needs to be practiced by monks to reduce the chances of developing VPs. It also suggests that monks should be aware of the problems related to their voice, symptoms and various risk factors. Also, there is a great need to educate the monks about the vocal health and importance of prevention of VPs. This can be done through workshops/ seminars about the voice and influencing factors. Further research can be conducted to find the additional risk factors responsible for the development of VPs by considering each risk factor and its impact on the vocal mechanism. This will be helpful for the professionals to develop effective programs that prevent the development of VPs.

REFERENCE

- Alva, A., Machado, M., Bhojwani, K., & Sreedharan, S. (2017). Study of Risk Factors for Development of Voice Disorders and its Impact on the Quality of Life of School Teachers in Mangalore, India. *Journal of Clinical and Diagnostic Research: JCDR*, 11(1), MC01. <https://doi.org/10.7860/JCDR/2017/17313.9234>
- Boominathan, P., Rajendran, A., Nagarajan, R., Seethapathy, J., & Gnanasekar, M. (2008). Vocal Abuse and Vocal Hygiene Practices Among Different Level Professional Voice Users in India: A Survey. *Asia Pacific Journal of Speech, Language and Hearing*, 11(1), 47-55. <https://doi.org/10.1179/136132808805297322>
- Boone, D., McFarlane, S., Berg, S. Von, & Zraick, R. (2005). *The voice and voice therapy*. Pearson.
- Boone, D. R. (1991). Expanding perspectives in care of the speaking voice. *Journal of Voice*, 5(2), 168–172. [https://doi.org/10.1016/S0892-1997\(05\)80180-8](https://doi.org/10.1016/S0892-1997(05)80180-8)
- Byeon, H. (2019). The risk factors related to voice disorder in teachers: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health* (Vol. 16, Issue 19). <https://doi.org/10.3390/ijerph16193675>
- Chan, R. W., & Tayama, N. (2002). Biomechanical effects of hydration in vocal fold tissues. *Otolaryngology - Head and Neck Surgery*, 126(5), 528–537. <https://doi.org/10.1067/MHN.2002.124936>
- Cham, T. C., & Hwei Mok, P. K. (2012). Voice Problems Amongst Primary School Teachers in Singapore. *Journal of Voice*, 26(4), e141–e147. <https://doi.org/10.1016/J.JVOICE.2011.05.004>

- Chen, S. (2018). *The Prevalence of Voice Disorders among Thai Monks in Prathum Thani Province, Thailand Name: Yaiyada Pusasilthorn.*
- Devadas, U., Bellur, R., & Maruthy, S. (2017). Prevalence and Risk Factors of Voice Problems Among Primary School Teachers in India. *Journal of Voice, 31*(1), 117.e1-117.e10. <https://doi.org/10.1016/J.JVOICE.2016.03.006>
- Devadas, U., Hegde, M., & Maruthy, S. (2019). Prevalence of and Risk Factors for Self-reported Voice Problems Among Hindu Temple Priests. *Journal of Voice, 33*(5), 805.e1-805.e12. <https://doi.org/10.1016/J.JVOICE.2018.03.020>
- Devadas, U., Jose, N., & Gunjawate, D. (2016). Prevalence and Influencing Risk Factors of Voice Problems in Priests in Kerala. *Journal of Voice, 30*(6), 771.e27-771.e32. <https://doi.org/10.1016/j.jvoice.2015.11.008>
- Devadas, U., Kumar, P. C., & Maruthy, S. (2020). Prevalence of and Risk Factors for Self-Reported Voice Problems Among Carnatic Singers. *Journal of Voice, 34*(2), 303.e1-303.e15. <https://doi.org/10.1016/J.JVOICE.2018.09.013>
- Havaldar, K., Bhat, S., & Hegde, S. (2014). Oral health status of Tibetan and local school children of Kushalnagar, Mysore district, India: A comparative study. *Journal of Indian Society of Pedodontics and Preventive Dentistry, 32*(2), 125. <https://doi.org/10.4103/0970-4388.130959>
- Higgins, K. P., & Smith, A. B. (2012). Prevalence and Characteristics of Voice Disorders in a Sample of University Teaching Faculty. *Contemporary Issues in Communication Science and Disorders, 39*, 69-75.
- Hočevár-Boltežar, I. (2009). Prevalence and risk factors for voice problems in priests. *121*(7–8), 276–281. <https://doi.org/10.1007/s00508-009-1163-1>

Jayakumar, T., Yasin, H. A. M., & Benoy, J. J. (2022). Prevalence of Voice Problems and Associated Risk Factors Among Tamil-Speaking Imams. *Journal of Voice*.
<https://doi.org/10.1016/j.jvoice.2022.11.022>

Janet Baker (2010) Women's voices: Lost or mislaid, stolen or strayed? *International Journal of Speech-Language Pathology*, 12:2, 94-106, DOI:
[10.3109/17549500903480060](https://doi.org/10.3109/17549500903480060)

Koufman, J., Sataloff, R. T., & Toohill, R. (1996). Laryngopharyngeal reflux: consensus conference report. *Journal of Voice*, 10(3), 215–216.
[https://doi.org/10.1016/S0892-1997\(96\)80001-4](https://doi.org/10.1016/S0892-1997(96)80001-4)

Lindhe, A. (2007). *Voice ergonomics - an overview of recent research*.

Mattiske, J. A., Oates, J. M., & Greenwood, K. M. (1998). Vocal Problems Among Teachers: A Review of Prevalence, Causes, Prevention, and Treatment. *Journal of Voice*, 12(4), 489–499.

Patnaik, Pratyusna., & Institute for Social and Economic Change. (2005). *Affirmative action and political participation: elected representatives in the panchayats of Orissa*. Institute for Social and Economic Change.

Przysiezny, P. E., & Przysiezny, L. T. S. (2015). Work-related voice disorder. *Brazilian Journal of Otorhinolaryngology*, 81(2),202.
<https://doi.org/10.1016/J.BJORL.2014.03.003>

Ravall, S., & Simberg, S. (2020). Voice Disorders and Voice Knowledge in Choir Singers. *Journal of Voice*, 34(1), 157 -157
<https://doi.org/10.1016/J.JVOICE.2018.07.005>

- Roy, N., Merrill, R. M., Thibeault, S., Parsa, R. A., Gray, S. D., & Smith, E. M. (2004). Prevalence of Voice Disorders in Teachers and the General Population. *Journal of Speech, Language, and Hearing Research*, 47(2), 281–293.
- Russell, A., Oates, J., & Greenwood, K. M. (1998). Prevalence of voice problems in teachers. *Journal of Voice*, 12(4), 467–479. [https://doi.org/10.1016/S0892-1997\(98\)80056-8](https://doi.org/10.1016/S0892-1997(98)80056-8)
- Sataloff, R., (2005) *Vocal Health and Pedagogy: Science, Assessment, and Treatment*, Third Edition. United States: Plural Publishing, Incorporated.
- Sataloff, R. T. (2008). Laryngopharyngeal reflux: Concepts and controversies. *Ear, Nose and Throat Journal*, 87(10), 549–554.
- Seifpanahi, S., Izadi, F., Jamshidi, A. A., Torabinezhad, F., Sarrafzadeh, J., Sobhani-Rad, D., & Ganjuie, M. (2016). Prevalence of Voice Disorders and Associated Risk Factors in Teachers and Nonteachers in Iran. *Journal of Voice* :30(4), 506.e19-506.e23. <https://doi.org/10.1016/J.JVOICE.2015.05.019>
- Smith, E., Lemke, J., Taylor, T., Kirchner, H. L., & Hoffman, H. (1998). *Frequency of Voice Problems Among Teachers and Other Occupations*. 12(4), 480–488.
- Stemple, J., Roy, N., & Klaben, B. (2018). *Clinical voice pathology: Theory and management*. <https://books.google.com/books?>
- Thibeault, S. L., Merrill, R. M., Roy, N., Gray, S. D., & Smith, E. M. (2004). Occupational risk factors associated with voice disorders among teachers. *Annals of Epidemiology*, 14(10), 786–792. <https://doi.org/10.1016/J.ANNEPIDEM.2004.03.004>

- Titze, I. R., & Martin, D. W. (1998). Principles of Voice Production. *The Journal of the Acoustical Society of America*, 104(3), 1148–1148.
- Valdís Ingibjörg Jónsdóttir. (2003). *The voice an occupational tool; a study of teacher's classroom speech and the effects of amplification*. Tampere University Press.
- Verdolini, K., & Ramig, L. O. (2001). Review: occupational risks for voice problems. *Logopedics, Phoniatics, Vocology*, 26(1), 37–46.
- Vilkman, E. (2004). Occupational Safety and Health Aspects of Voice and Speech Professions. *Logopaedica*, 56(4), 220–253. <https://doi.org/10.1159/000078344>

APPENDIX I

Questionnaire

Prevalence of and risk factors for self-reported voice problems

in Tibetan Monks

Demographic details

Age:

Education:

This is a self-reporting questionnaire to find the prevalence and the risk factors for the voice problems in Tibetan monks. All responses collected within this will only be used for research purpose and no personal details of the participant shall be shared on any platform.

Occupation related

1. Since how many years you are serving as monk?
 - 0–5 years 6–10 years 11–15 years 16–20 years >20 years
2. Since how many years you are praying(chanting)?
 - 0–5 years 6–10 years 11–15 years 16–20 years >20 years
3. Are you trained to chant during the prayer? Yes/No
 - a) If yes, how many years?
 - 0–5 years 6–10 years 11–15 years 16–20 years >20 years
4. How many hours do you pray in a day?
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8 hours
5. Are you involved in singing loud prayer? Yes/No
 - a) If yes, how many hours per day?
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8 hours
 - b) On an average in a day how long do you pray continuously in a loud voice?
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8 hours
6. Are you involved in Soft Prayer? Yes/No
 - a. If yes, how many hours per day
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8 hours
 - b. On average in a day how long do you pray continuously in a soft voice?
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8 hours
7. Do you pray in the presence of musical instruments? Yes/No
 - a. How loud is the sound from the background musical instruments
 - Soft (40 dB) Moderate (60 dB) Loud (70–90 dB) Very loud (>100 dB)
 - b. Do you feel the need to raise your voice while reciting prayer against background noise from the musical instruments? Yes/No
 - c. If yes, how noisy do you think is the environment during the prayer?
 - Soft (40 dB) Moderate (60 dB) Loud (70–90 dB) Very loud (>100 dB)
 - d. For how many hours per day do you chant in a noisy environment?
 - <1 hour 1–3 hours 4–6 hours 6–8 hours >8hours

8. Do you sip water in between prayers to overcome the dryness of the throat? Yes/No
 a. If yes how often do you sip water?
 Once in 10 minutes once in 30 minutes once in hour once in 2 two hours
9. Do you have a job in addition to being a monk? Yes/No
 a. If yes, does it involve extensive voice usage? Yes/No
 b. If yes, please describe your voice use.
 c. Do you indulge in singing or mimicry? Yes/No

Prevalence of voice problems and awareness of vocal symptoms

10. Have you had any voice-related problems since you started this profession that has prevented you from chanting prayers or which interfered with your profession? Yes/No
 a. If you have experienced voice problem, how often was it?
 once in 6 months once in 2–3 months once a month once in 15 days once a week
 b. When did you first notice your voice problem?
 last 1 week last 1 month last 6 months last 1 year >1 year
 c. How will you describe the onset of your voice problem?
 sudden gradual intermittent progressive
 d. Is your voice problem getting worse day by day? Yes/No
11. What do you think are the risk factors for developing a voice problem?
 Loud chanting or talking continuous talking or chanting background noise smoke (from fire, incense stick, or camphor) all of the above.
12. Do you think adequate voice rest during throat infections can protect you from developing voice problems? Yes/No
13. Do you have a problem with your voice today, which is preventing you from doing all you want to do? Yes/No
 a. If yes, how severe is the problem?
 very mild (<10%) mild (10%–30%) moderate (31%–60%) severe (61%–90%) very severe (>90%)

Please indicate which of the following voice problems you experience often while or after chanting or speaking. Do not include times when the voice problems are associated with illness.

14. Hoarseness Yes/No
 15. Dryness in the throat Yes/No
 16. Voice fatigue Yes/No
 17. Tightness in the throat Yes/No
 18. Momentary loss of voice or sudden changes in voice or pitch breaks Yes/No
 19. Discomfort in the throat Yes/No
 20. Pain in the throat Yes/No
 21. Reduced breath support or shortness of breath Yes/No
 22. Loss of voice Yes/No
 23. Trouble with speaking loudly Yes/No

24. Frequent coughing Yes/No

Vocal abusive behaviors or phonotraumatic behaviors

25. Do you speak with a loud voice? Yes/ No
26. Do you consciously alter your voice or speech with respect to pitch, loudness, or voice quality? Yes/No
27. Do you speak fast? Yes/No
28. Do you usually find yourself doing most of the talking when conversing with a friend or in a social gathering? Yes/No
29. Do you clear your throat often? Yes/No
30. Do you cough frequently? Yes/No
31. Do you chant or speak when you have any throat infections? Yes/No
32. Do you chant or speak when you have any voice problem? Yes/No

Lifestyle related

33. Do you have odd timings of food intake? Yes/No
If yes, commonly at what time do you have your food?
Breakfast:
Lunch:
Dinner:
34. Does your diet involve the following food items:
Spicy or oily food
 never rarely sometimes often always
Extreme hot or cold items
 never rarely sometimes often always
35. Do you fast? Yes
/No
a. How often do you fast?
 once in 15 days once a week 2 days week 3 days a week 4 days a week
36. Do you chew pan or betel?
 never rarely sometimes often always
37. Do you have a habit of drinking alcohol? Yes /No
a. If yes, how often do you drink?
 once in 15 days once a week 2 days a week 3 days a week 4 days a week
38. Do you have a habit of smoking? Yes /No
a. If yes, how often do you smoke?
 once in 15 days once a week 2 days a week 3 days a week 4 days a week
b. how many cigarettes do you smoke approximately per day?
 1-5 6 -10 11-15 16-20 > 20
39. On average, how many glasses of each of the following do you drink per day?
a. Coffee _____ cups/day
b. Tea _____ cups/day
c. Water _____ glasses/day
d. Carbonated juice _____ ml/day
e. Non carbonated juice _____ ml/day

Health-related factors

Please indicate if you have any of the following problems that interfere with good health (physical and mental) on a regular basis.

40. Asthma Yes/No
 41. Sinus problems Yes/No
 42. Nasal allergies Yes/No
 43. Frequent cold and cough Yes/No
 44. Dry mouth or throat Yes/No
 45. Difficulty in hearing normal conversation Yes/no
 46. Acid reflux or heartburn Yes/No
 47. Stress related to your profession Yes/No
 48. Do you take any medication regularly for any of these problems? Yes/No

a. If yes, please indicate for which health problem and what medications.

Impact of voice problem

49. How do you feel about your voice problem?
 it does not affect me rarely frustrates me sometimes frustrates me often frustrates me it is a major source of stress and frustration
50. In the past one year, how much have you missed praying because of a problem with your voice?
 none 2–3 days about a week about 2 weeks >2 week
51. Does the voice problem affect your profession and in turn cause financial burden? Yes/No
52. Does your voice problem cause you to interact less with your family or friends? Yes/No
53. Do you avoid going out socially because of the voice problem? Yes/No
54. Do you have trouble using the telephone? Yes/No
55. Do you have to repeat yourself to be understood? Yes/No

Voice care

56. Have you ever consulted physician, ear, nose, and throat (ENT) specialist, or speech-language pathologist (SLPs) for your voice problem? Yes/No
57. Have you received specific instructions about caring for voice? Yes/No
 a. If yes, from whom did you receive these instructions?
 ENT specialist singing teachers physician therapist others;
 please specify
 What instructions about voice care were given to you?
 Please specify.
58. If you have not received any instructions for voice care, what precautions you followed for caring for your voice?
 voice rest vocal hygiene home remedies drinking water any other
59. Are you interested in receiving instructions for voice care in future? Yes/No