

Original Research Article

## Return-To-Work Status And Quality Of Life Of Persons With Lower Limb Amputation In South India

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### ABSTRACT

**Aim:** The constraints brought forth by amputation cause immense impairments in the realms of physical, social, and psychological functioning of individuals. The exact estimates of the number of persons with amputation in India are unknown. Past studies report that the incidence of amputation is 0.62/1000 individuals in India, which is nearly 1 million of its population. Lower limb amputation impacts Return-to-Work status. Prosthetic training offered to individuals with lower limb amputation could empower them to get back to work, thus refining their Quality of Life. The aim of this study is to determine the Return-to-Work status and Quality of Life of persons with lower limb amputation after prosthetic training.

**Method:** This cross-sectional observational study recruited eighty-four participants who underwent prosthetic training after lower limb amputation from a tertiary care hospital in South India. Demographic and clinical characteristics were obtained using a self-designed data form through a telephone survey. Quality of Life was measured using WHOQOL-BREF. Data analysis was done using chi square tests and t-tests.

**Results:** In our study, we found that 60.7% of our participants returned to work. Prosthetic use (p value = 0.016) and independence with transfers (p value = 0.007) are significant factors that facilitated positive Return-to-Work. Psychosocial characteristics such as self-motivation (p value = 0.001), social support (p value= 0.001) and family support (p value = 0.017) have enabled individuals to get back to work. Quality of Life among individuals who returned to work was found to be significantly higher than the persons who have not returned to work in all domains (p value < 0.01).

**Conclusion :** Prosthetic training has enabled persons with lower limb amputation to get back to their work. Daily use of prosthesis coupled with socket comfort, has facilitated positive Return-to-Work, thereby improving their Quality of Life.

**Keywords:** Lower limb amputation, Prosthetic Training, Return-to-Work, Quality of Life

**Editor:** Solomon Mekonnen

#### Article History:

Received: June 9, 2025

Accepted: May 14, 2026

Published: June 10, 2026

**Citation:** Alisha Rose Sebastian, Jerome Dany Praveen Raj Jones, Suresh Annpatriciatherine, Maya P.G, Return-To-Work Status And Quality Of Life Of Persons With Lower Limb Amputation In South India . DCIDJ. 2026, 37:2. doi.org/10.20372/dcidj.884

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### INTRODUCTION

Lower limb amputation stands as one of the most profound physical and psychological challenges, leading to significant disfigurement, reduced mobility, and heightened vulnerability to losing one's independence (Sinha et al., 2011). In 2017, it was estimated

that 57.7 million people worldwide had undergone amputation due to trauma (McDonald et al., 2021). In low and middle-income countries, road traffic accidents are the main cause of the same, and the most affected persons are men who belong to the working-class population (McDonald et al., 2021; Sinha et al., 2011; Shankar et al., 2020). Deterrents yielded by the consequences of lower limb amputation influence physical, social, and psychological functioning of the individuals (Schoppen, Boonstra, Groothoff, de Vries, et al., 2001). This might cause absenteeism in workplaces and sometimes leading to discontinuation of jobs (Burger & Marinček, 2007). The threat of loss of capacity to work and the potential to earn a livelihood subsequent to such trauma is of paramount concern to both the survivors as well as to the society (Asano et al., 2008). Studies conducted in the UK and Ontario report that 66% to 74% of people returned to work after lower limb amputation (Magnusson et al., 2019; Gerhards et al., 1984). Studies indicate that a significant number of persons have returned to work but the types of job in which they have occupied themselves are physically less demanding and require modifications (Schoppen, Boonstra, Groothoff, de Vries, et al., 2001). The combination of comfortable prosthetic usage, high-quality vocational services and comprehensive in-patient rehabilitation services facilitate individuals' Return-to-Work (Schoppen, Boonstra, Groothoff, de Vries, et al., 2001; Hebert & Ashworth, 2006; Schoppen, Boonstra, Groothoff, Sonderen, et al., 2001). Personal and social factors regarding the place of work of a person play an important role in determining the status of Return-to-Work (Bruins et al., 2003). Acclimating to new challenges following amputation is indeed a barrier that would hinder the participation of most of the survivors (Batten et al., 2020). Discrimination and exclusion from society tend to restrict individuals within the confines of their insecurities. Challenges stemming from environmental factors such as architectural barriers, uneven terrains, climate, crowded spaces etc., are the hurdles that impose substantial restrictions on persons with lower limb amputation (Batten et al., 2020). The lack of modifications at homes and workplaces reduced the functional use of prostheses (Stuckey et al., 2020). A shortage of multidisciplinary teams and lack of accessibility to rehabilitation services have prevented individuals in South Africa from re-integrating into society (Naidoo & Ennion, 2019). Efficient prosthetic use coupled with requisite fitness promotes optimum performance (Batten et al., 2020). Walking is a meaningful function that enables individuals to actively participate in family and social situations by evoking an appreciable sense of independence (Batten et al., 2020).

Determining the Quality of Life of individuals suffering from physical disabilities would enable us to understand the challenges posed by them and also to analyse the outcomes of rehabilitative services being offered to them (Magnusson et al., 2019). The Quality of Life in persons with amputation has been studied less compared to other conditions (Matos et al., 2020). The existing studies have focused more on physical aspects rather than biopsychosocial well-being (Matos et al., 2020). In developed countries, the prevalence of people with lower limb amputation is above 65 years and is mostly due to vascular complications (Sinha et al., 2011). Since they belong to the retired population, the relevance of Return-to-Work status in determining the Quality of Life has not been reported much (Sinha et al., 2011). In contrast, in developing countries, one of the leading causes of lower limb amputation is trauma, and people who are subjected to it are men who belong to the working population with a mean age of 37 years (Sinha et al., 2011). For a country like India where men are the primary breadwinners of families, their status of unemployment will negatively affect the living standards and self-worth as well (Shankar et al., 2020). The ability to walk independently serves as a milestone to the liberty to live independently (Matos et al., 2020). There have not been many studies identified that assess the significance of Return-to-Work status in influencing the Quality of Life in persons after lower limb amputation in India (Schoppen, Boonstra, Groothoff, de Vries, et

al., 2001; Sinha et al., 2011). Also, there are fewer studies relating to psychosocial status and Quality of Life in these persons at tertiary health care services (Matos et al., 2020). Timely access to rehabilitation can curtail the effects of disability and worker-role hardships accompanied by it. Prosthetic training offered by the multidisciplinary services of our institution offers functional training and helps persons with lower limb amputation to be self-reliant in the matter of mobility. Despite the possible restoration of independence with mobility and transfers, persons with lower limb amputation tend to be either inhibited or prevented from returning to work (Bruins et al., 2003). Identifying the Return-to-Work status would help us in determining the extent to which individuals have made use of the rehabilitative services so that further interventions can be brought forward in the future for the betterment and upliftment of these individuals (Davie-Smith et al., 2017; Magnusson et al., 2019). Therefore, this study aims to identify both the return-to-work status and Quality of Life of persons with lower limb amputation who have undergone prosthetic training. Furthermore, it compares the differences in Quality of Life among individuals who have returned to work to that of people who have not returned to work.

## METHODS

This study employed a cross-sectional observational survey design and was conducted in the outpatient unit of the Department of Occupational Therapy. The study setting provided access to participants receiving outpatient occupational therapy services during the study period.

### Ethical Considerations

This study was approved by the Institutional Research and Ethics Committee (IRB MIN No. 14463 dated 09.02.2022).

### Sample Size

The sample size required to find the Return-to-Work status of people with lower limb amputation is 82, with a 95% Confidence interval and at 10% precision. The sample size calculation is given below:

$$n = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

Where,

**p** : Expected proportion

**d** : Absolute precision

**1-  $\alpha/2$**  : Desired Confidence level

### Data Collection Procedures

This cross-sectional observational survey recruited eighty-four participants through purposive sampling. The contact information of the individuals who underwent lower limb amputation and completed prosthetic training, residing within a 100km radius of our centre from the years 2017 to 2021 was obtained by the principal investigator from the database of our tertiary care hospital. Individuals aged between 18 and 60 years who underwent lower limb amputation due to diabetes or traumatic causes (excluding

malignancies) and who have completed prosthetic training at our hospital were contacted by the principal investigator, through a telephone survey. Participant Information Sheet and Informed Consent form was read aloud. The Principal Investigator documented the verbal consent, along with recording the subject's name, the representative's name, and the date on which verbal consent was obtained.

Return-to-work status was evaluated using a self-designed data collection form developed based on prior literature, from a study conducted at our centre (Blessyolive et al., 2021). The form comprised thirty-nine questions across eight domains: demographic data, amputation characteristics, prosthetic use, work characteristics, environmental factors, transport and mobility, psychosocial aspects, and financial status. We required a culturally specific and contextually relevant data collection form that aligned with our service delivery. As no such forms were readily available for our context, the above-mentioned data form was developed. The items in the form were reviewed and subsequently modified by experts in our institution before administration. The WHOQOL-BREF questionnaire was used to identify the Quality of Life. It contains a total of 26 questions, and has been found to have good psychometric properties of reliability, validity and internal consistency. (Cronbach's  $\alpha > 0.7$ ). The World Health Organization Quality of Life -Bref (WHOQOL-Bref) questionnaire is an abbreviated version of the WHOQOL-100 addressed to adults. It consists of two general questions (one covering overall QOL and one addressing the person's general health situation) and 24 specific questions covering four domains of QOL: physical health (seven items), psychological (six items), social relationships (three items), and environment (eight items). Each item is answered on a scale of 1 to 5, with 5 signifying the highest QOL. WHOQOL-BREF demonstrates good discriminant validity, content validity, internal consistency and test-retest reliability. This is of great help in a brief assessment of Quality of Life. The overall duration of the telephone survey was 45 to 60 minutes.

### Data Management And Analysis

Data analysis was done using SPSS Version 21.0 The data were presented using descriptive statistics (mean and standard deviation) and frequency/percentage. The statistical significance between the categorical variables was tested using independent samples t-test and chi square test. A P value  $<0.05$  was considered statistically significant.

## RESULTS

Prior to their amputation, a vast majority of the subjects were active members of the workforce. Following the procedure, there was a notable decline in employment rates, with only a portion of the original group successfully maintaining or obtaining a job. Among those who did return to work, the most common outcome was returning to the same position they held previously, while a significant number of others transitioned into entirely different roles. A small minority of the group entered the workforce for the first time post-amputation.

Conversely, for the substantial group that remained unemployed, several key barriers to re-entry were identified. The most prominent obstacles included physical discomfort associated with using prosthetic devices and various logistical hurdles, such as a lack of resources, limited transportation options, and personal anxieties regarding their new circumstances. A large segment of the unemployed population also cited a variety of other unspecified reasons for their inability to return to the workforce(Figure 1).

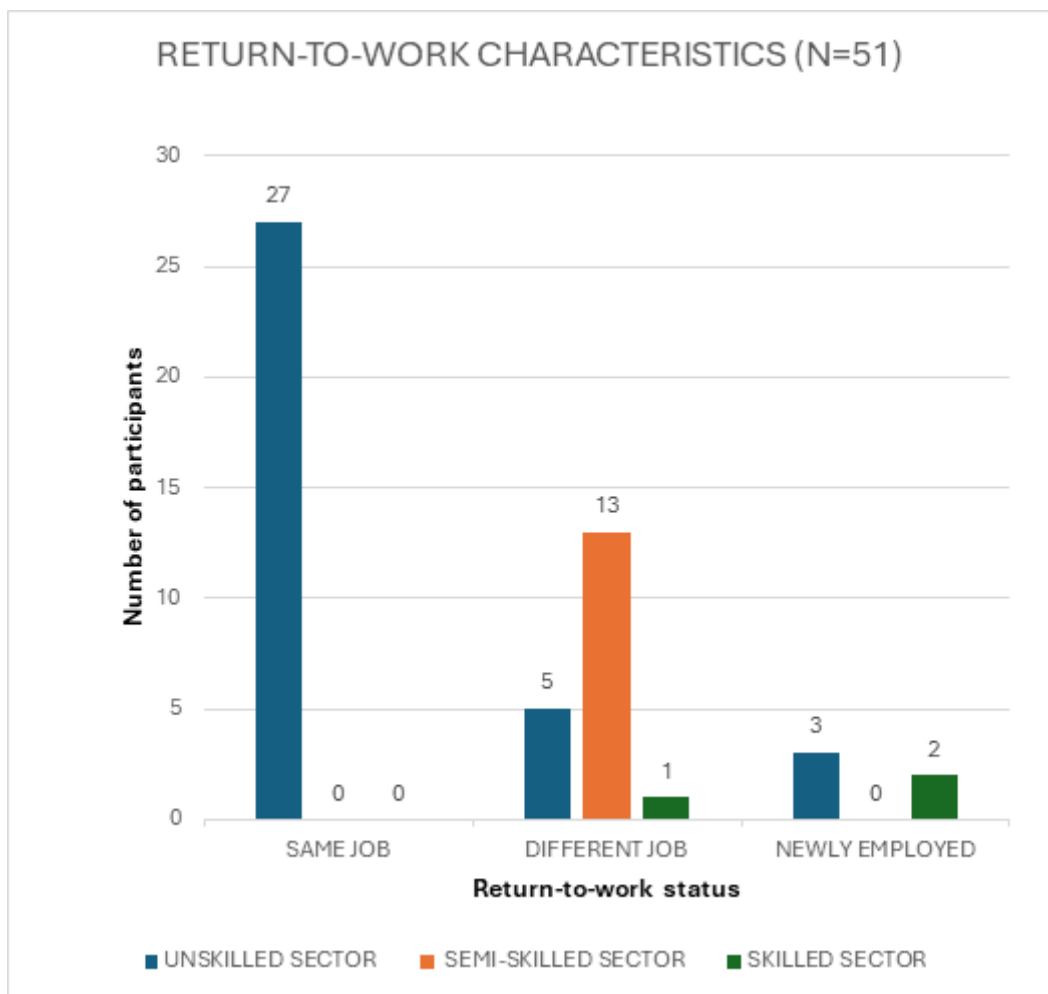


Figure 1: Return-Work-Characteristics

The survey population was predominantly comprised of males, with a much smaller representation of females and a single transgender participant. This gender disparity carried over into the employment outcomes, as the vast majority of those who successfully returned to work were men, while only a small handful of women were able to do the same. Conversely, among those who remained unemployed following their amputation, males still made up the largest group, though women and the transgender participant also accounted for a portion of this population. Statistical analysis confirmed that men were significantly more likely to return to the workforce than women, marking gender as a primary factor in post-amputation employment success. In contrast, other personal factors such as educational background and marital status did not appear to have a meaningful impact on whether or not an individual returned to work (Table 1a, Table 1b).

Table 1a: Demographic Details Of Participants

Demographic Details		Number (N=84)	Employed (N=51)	Unem- ployed (N=33)	P- Value
Gender	Male	70(83.3%)	47(92.1 %)	23(69.6%)	0.022*
	Female	13(15.4%)	4(7.8%)	9(27.2%)	
	Transgender	1(1.1%)	0	1(3%)	
Education	0-5th Standard	14(16.6%)	6(11.7%)	8 (24.2%)	0.554
	6-10th Standard	40(47.6%)	24(47%)	16(48.4%)	
	11-12th Standard	9(10.7%)	7(13.7%)	2(6%)	

	Diploma/ Graduation	13(15.6%)	8(15.6%)	5(15.1%)	
	Post Graduation	7(8.33%)	5(9.8%)	2(6.06%)	
Marital Status	Married	70(83.3%)	44(86.2%)	26(78.7%)	0.369
	Unmarried	14(16.6%)	7(13.7%)	7(21.2%)	

\*\* Denotes Statistical Significance(P<0.05)

Table 1b – Employment Status Based On Gender And Education

Gender	Education	Employed	Not Em- ployed	Total no. of individuals
Males	0-5th grade	5	6	11
	6-10th grade	24	11	35
	11-12th grade	6	1	7
	Diploma/Graduate	8	4	12
	PG	4	1	5
	Sum			
Females	0-5th grade	1	2	3
	6-10th grade	1	5	6
	11-12th grade	1	0	1
	Diploma/Graduate	0	1	1
	PG	1	1	2
	Sum			
Transgender	0-5th grade	0	0	0
	6-10th grade	0	0	0
	11-12th grade	0	1	1
	Diploma/Graduate	0	0	0
	PG	0	0	0
	Sum			

The data regarding amputation and prosthetic characteristics highlights that the primary drivers for lower limb amputation were road traffic accidents, diabetes, and trauma. Among these, road traffic accidents emerged as the most frequent cause of lower limb amputations, though the specific cause did not significantly influence whether an individual successfully returned to work. For those utilizing prostheses, a vast majority incorporated them into their daily lives, with most expressing overall satisfaction with their devices. In terms of mobility, participants relied on various forms of transportation, including two-wheelers, buses, and auto-rickshaws. Crucially, nearly all individuals who re-entered the workforce reported a high level of functional autonomy, noting they were able to manage physical transfers independently to access transportation and reach their necessary destinations (Table 2).

Table 2: Amputation, Prosthetic, And Mobility Characteristics

Factors Associ- ated With Re- turn-To- Work	Amputation Characteristics	Return To- Work Status		P- Value
		Employed	Unemployed	
Cause	Road Traffic Acci- dents	43(84.31%)	24(72.7%)	0.43
	Diabetes	7(13.7%)	8(24.2%)	

	Traumatized	1 (1.96%)	1(3.03%)	
Side	Left	16(31.3%)	18(54.5%)	0.013*
	Right	35(68.6%)	13(39.3%)	
	Bilateral	0(0%)	2(6.06%)	
Level	Hip Disarticulation	0(0%)	1(3.03%)	0.662
	Transfemoral	16(31.3%)	12(36.3%)	
	Knee Disarticulation	5(9.8%)	4(12.1%)	
	Transtibial	28(54.9%)	16(48.4%)	
	Symes	1(1.96%)	0(0%)	
	Others	1(1.96%)	0(0%)	
	Prosthetic Use			
Daily Use	Yes	47(92.1%)	24 (28.5%)	0.016*
	No	4(7.84%)	9(10.7%)	
Satisfaction	Yes	41(80.3%)	21(25 %)	0.008*
	No	10(11.9%)	12(14.2%)	
Mobility Independence In Transfers	Yes	47(92.1%)	23(69.6%)	0.007*
	No	4(7.84%)	10(30.30%)	
Accessibility To Places	Yes	47(92.1%)	26(78.7%)	0.076
	No	4(7.84%)	7(21.2%)	

\*Denotes statistical significance(p<0.05)

The psychosocial and financial landscape for those returning to work was characterized by a sense of internal drive, with almost all employed individuals citing self-motivation as a primary factor in their transition. Beyond personal determination, the vast majority benefited from the support of their families, which served as a crucial pillar of support during the recovery process. While family ties were a dominant influence, a smaller segment of the population also noted the importance of broader social support systems in facilitating their successful return to the workforce (Table 3).

Table 3: Psychosocial And Financial Characteristics

Psychosocial Characteristics		Employed (N=51)	Unemployed (N=33)	P Value
Self-Motivation	Yes	50(98.0%)	11(33.3%)	<0.001 *
	No	1(1.96%)	22(66.6%)	
Family Support	Yes	45(88.2%)	11(33%)	<0.001 *
	No	6(11.7%)	22(67%)	
Social Support	Yes	8 (15.6%)	0 (0%)	0.017*
	No	43(84.3%)	33(100%)	

Financial Characteristics

Adequate Income	Yes	7(13.7%)	1(3.03%)	0.103
	No	44(86.2%)	32(96.9%)	
Disability Pension	Yes	33(64.7%)	25(75.7%)	0.285
	No	18(35.2 %)	8(24.2%)	
Earning Members (Number)	0	0(0%)	6(18.1%)	0.015*
	1	34(66.6 %)	19(57.5%)	
	2	16(31.3%)	8(24.2%)	
	3	1 (1.96 %)	0 (0%)	

\*Denotes statistical significance (p<0.05)

**Table 4** shows a comparison of the Quality of Life among employed and unemployed people. People who have returned to work had reported a better Quality of Life compared to the people who have not been employed, in all four domains of the WHOQOL-BREF Scores (p value<0.01).

Tabl 4: Comparison Of Quality Of Life Of Employed And Unemployed People

Quality of Life Domains	Employed (n = 51)		Unemployed (n = 33)		P-value
	Mean	Standard Deviation	Mean	Standard Deviation	
Physical Qol	78.78	14.14	55.18	26.89	<0.01*
Psychological Qol	65.64	13.67	48.78	15.95	<0.01*
Social Qol	59.29	15.023	40.76	18.10	<0.01*
Environmental Qol	68.35	13.37	52.18	15.95	<0.01*

\*Denotes statistical significance (p<0.05)

## DISCUSSION

From our study, it was found that 60.7% of the subjects have returned to work following amputation, which is consistent with the Return-to-Work rate in previous studies, ranging from 57% to 77% (Hebert & Ashworth, 2006; Journeay et al., 2018; Millstein et al., 1985; Schoppen, Boonstra, Groothoff, de Vries, et al., 2001). **[Figure 1]** Married males accounted for 92.15% of the individuals who returned to work, with 64.2% of respondents reporting that they were the only earning members in their families.**[Table 1A]**

The necessity of supporting their family as the sole breadwinner has compelled them to return to work. Our findings are also analogous to previous studies that report that males who are primary breadwinners have better Return-to-Work outcomes (Gerhards et al., 1984; Shankar et al., 2020; Whyte & Carroll, 2002).

Among the people who returned to work, 52.9% retained their jobs, 37.2% had a change of job, and 9.8% were employed in a new job. **[Figure 1]** A majority of our participants with transtibial amputations (54.9%) had returned to work. **[Table 2]**

All individuals who returned to the same job belonged to the unskilled work sector, which included self-employment and was predominantly agricultural activities. The largest group (27 individuals) resumed the same unskilled job, indicating strong job retention but limited diversification. **[Figure 1]**

Returning to the same job in the unskilled sector may reflect economic necessity rather than choice, as individuals may lack opportunities to upgrade their skills or shift to other sectors. In contrast, the semi-skilled sector absorbed the highest number of

individuals who had a change of job. The skilled sector remained marginal, with only 3 individuals represented, highlighting barriers to entry such as higher qualifications, training requirements, or reduced accessibility following rehabilitation.

A study by Millstein reports that the provision of vocational training and counseling services have facilitated Return-to-work (Millstein et al., 1985). Only one person out of the 51 employed benefitted from vocational training services in our study. The reason for this could be the lack of vocational training centres within the vicinity of our hospital.

The type of jobs in which people have employed themselves following amputation differ according to studies and is dependent on the previous occupation and level of amputation (Burger & Marinček, 2007). In studying the levels of amputation, we did not find any statistically significant association between levels of amputation and Return-to-Work. This is contrary to findings stated in the literature which reports that different levels of amputation have shown variations in employment status and the lower the level of amputation, the better the return-to-work status (Burger & Marinček, 2007; Gerhards et al., 1984; Millstein et al., 1985). Our sample had an uneven representation of people with different levels of amputation; since the numbers varied for each level, this would not have contributed to statistical significance.

Daily prosthesis use was reported by 92.1% of the people who returned to work, with 80.3% of them expressing satisfaction with their prosthesis. **[Table 2]** In our hospital, following the completion of the prosthetic training program, patients are asked to report to the amputee follow-up clinic. They are instructed to visit the clinic if there are any issues with prosthetic fit or any other problems with the stump that make prosthetic use difficult. We believe that a systematic prosthetic training program and follow-up would have strengthened prosthetic use. Research shows that frequent and continuous prosthetic use influence positive Return-to-Work (Gerhards et al., 1984). All the participants who used prosthesis daily were independent with transfers and had accessibility to their places of need. Prosthetic training begins with orientation - which involves familiarizing the individual with the prosthesis, including its parts, functioning, wearing schedule, and maintenance, followed by an initial check-out by a multidisciplinary team to assess alignment, comfort, fitting, and overall functioning. During this phase, patients are taught the techniques of donning and doffing the prosthesis and are guided in performing transfers with the aid of mobility devices. Once orientation is complete, functional training focuses on progressive skill development, starting with weight-bearing on the prosthesis and transfers from a plinth or chair using various supports such as a quadripod or cane, eventually advancing to transfers without external assistance. Training also emphasizes standing balance activities, obstacle crossing with different levels of support, pivot transfers, and floor transfers, gradually preparing the individual for community ambulation. This includes negotiating ramps and stairs, walking on uneven terrain, moving through crowded environments, and learning transfer strategies for public transport, thereby enabling safe and independent participation in daily and social activities. Our protocols also include educating patients to modify their environment and remove architectural barriers to maximize participation and function.

Among those who were employed, 98.03% reported that they had self-motivation, and 88.2% had adequate family support and 15.08% subjects had social support to get back to work. Most of the unemployed individuals had a low level of self-motivation and family support and no one received social support that could enable them to return to work. **[Table 3]**

In developed countries, the relevance of Return-to-Work status in determining Quality of Life has not been predominantly reported much (Sinha et al., 2011). We identified that people who returned to work have a better Quality of Life compared to individuals

who have not. Among the individuals who returned to work, the mean Quality of Life score was highest in the physical domain (mean 78.78, SD=14.14), followed by environmental domain (Mean= 68.35, SD= 13.37), psychological domain (Mean= 65.64, SD= 13.67) and social domain (Mean= 59.29, SD= 15.02). This contradicts the study conducted in Pune at a tertiary prosthetic rehabilitation center, where the mean Quality of Life score was highest in the social domain and lowest in the physical domain (Shankar et al., 2020). Their study recruited individuals who had a recent amputation and who were not aided with prostheses. In our findings, the highest score in the physical domain shows that prosthetic training has helped them to be independent in their daily activities and has enabled them to access their needs. This is supported by a study conducted in Mumbai, which states that use of prosthesis influences the domain of physical health positively among individuals with lower limb amputation (Sinha et al., 2011). The satisfaction with prosthetic use, as reported by 80.39% of the subjects who have returned to work would also have helped them adapt functionally with the level of amputation. A study conducted in Brazil stated that functional satisfaction with prosthesis improves the Quality of Life among persons with lower limb amputation (Matos et al., 2020). From our study, better adaptability and satisfaction with the prostheses would have enabled individuals to relearn transfer techniques and regain functional abilities. This also helped in maximizing independence to access transport and other areas of their needs, which improved the Quality of Life in the environmental domain. Our study found that people who had self-motivation, family support and social support returned to work. This could be a determining factor for improved psychological health among employed individuals.

In studying the Return-to-Work status in rehabilitated persons with lower limb amputation, factors such as male gender, daily prosthetic use, good satisfaction with the prosthesis, independence in transfers, accessibility to places, self-employment, good self-motivation, family support and social support were influencing factors for returning to work. People who have returned to work had a better Quality of Life compared to those who did not return to work.

### Limitations

The mode of administration of the interview was through a telephonic survey, as this was convenient due to COVID-19 pandemic situation. Hence, the accuracy of the information could be challenged. Since this is a cross-sectional survey, the results obtained cannot be generalized for a larger population. The objective of our study was to identify the Return-to-Work status of individuals following lower limb amputation; hence, the reasons for successful and unsuccessful job reintegration were not studied in depth. Since the participants were not met in person, their functional status could not be assessed.

### CONCLUSION

Most of the participants in our study population have returned to work after prosthetic training (60.7%). Self-motivation, family support, social support, self-employment effective prosthetic use and satisfaction have enabled people with lower limb amputation to return to work. People with a positive Return-to-Work status have experienced a better Quality of Life compared to those who have not returned to work.

### Implications

The role of prosthetic training extends beyond functional mobility; it serves as a critical enabler of workforce reintegration. This underscores the need for structured, accessible, and context-specific prosthetic training as a core component of rehabilitation services with multidisciplinary team integration. Gainful employment not only contributes to financial independence but also enhances psychological well-being, social participation, and overall life satisfaction. These findings suggest that rehabilitation programs should adopt a holistic approach that integrates vocational goals alongside physical

recovery. A lack of vocational training programs has been identified. Additionally, workplace accommodations and employer awareness programs may further facilitate successful reintegration. Future research should explore the long-term sustainability of employment outcomes and identify factors that influence a successful return to work, such as the demands of occupation, level of training, and social support systems. The reasons behind the lack of Return-to-Work need to be examined along with the effectiveness of social support systems.

**Acknowledgement:** The authors would like to express their gratitude to the participants who consented to be a part of this study.

**Ethical approval:** Ethical approval was obtained before the commencement of this study. The participants gave their informed consent after the purpose and nature of the study were explained to them.

**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

**Declaration of interest:** the authors report no conflict of interest

**Data availability and statement:** to ensure the confidentiality of the study participants, the details of the study were stored in encrypted, password-protected files with restricted access limited to the principal investigator and authorized research team members. Participants were informed in advance about how their inputs would be used, who would have access to them, and the measures in place to protect their privacy and confidentiality. Informed consent was obtained, and the participants were assured of their rights to confidentiality throughout the study. These measures align with ethical guidelines and best practices for protecting participant privacy and maintaining research integrity.

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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